Virginia Wildlife

APRIL 1963

VOLUME XXIV / NUMBER 4

20 CENTS

Virginia Wildlife

Dedicated to the Conservation of Virginia's Wildlife and Related Natural Resources and to the Betterment of Outdoor Recreation in Virginia

Published by VIRGINIA COMMISSION OF GAME AND INLAND FISHERIES, *Richmond 13, Virginia*

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APRIL

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COVER: Not a native of Virginia waters, the brown trout is being restocked experimentally in a number of trout streams. Since hatchery raised browns are not as easy to catch as rainbows on opening day, it is hoped that these fish can be used to extend productive trout fishing over a longer period of time. Our artist: Duane Raver.

SUBSCRIPTIONS: One year, $1.50; three years, $3.50. Give check or money order, made payable to the Treasurer of Virginia, to local game commission employee or send to Commission of Game and Inland Fisheries, P. O. Box 1642, Richmond 13, Virginia.

VIRGINIA WILDLIFE is published monthly at Richmond 13, Virginia, by the Commission of Game and Inland Fisheries, 7 North Second Street. All magazine subscriptions, change of address notices, and inquiries should be sent to Box 1642, Richmond. The editorial office gratefully receives for publication news items, articles, photographs, and sketches of good quality which deal with Virginia's soils, water, forests, and wildlife. The Commission assumes no responsibility for unsolicited manuscripts and illustrative material. Credit is given on material published. Permission to reprint text material is granted provided credit is given the Virginia Commission of Game and Inland Fisheries and VIRGINIA WILDLIFE. Clearances must be made with photographers or artists to reproduce illustrations.

Second-class postage paid at Richmond, Va.

WHERE SPRING IS

THIS really is not the time for mortal man to try to hold forth on the editorial stage. Competition is too keen. A better show has opened. A more powerful and persuasive voice is speaking. Let us give heed.

The ice and snow of the season of discontent disappear. Bright skies and warming sun put winter storms and dreary days to flight. The blackbird broadcasts pure joy from his reedy niche. Where once there was death, life springs anew. Beauty reigns where ugliness held sway.

A promise is redeemed again. There is a freshness and a rejuvenation which man did not call forth, nor which he could prevent. In fact, man has precious little to do with spring at all, except to feel and enjoy and be grateful for it.

Spring is a kind of forgiveness. Many scars of last year's greed and thoughtlessness are covered and erased, and no longer stand as grim reminders of past mistakes and transgressions against the land. The earth is made ready to pour out its bounty once again.

Each spring is another chance, undeserved, perhaps, but granted anyway—a promise redeemed, an opportunity restored, an obligation reimposed.

To hear the message of spring, to march to its beat, one should go where spring is—outdoors. Virginians are fortunate. They have much outdoors into which to go. No one in the Old Dominion is more than a few miles in distance or a few minutes in time from a bit of woodland, an open meadow, a stretch of sparkling water. No one is far from spring.

It takes little effort or preparation to reap April's blessing. It is as easy as accepting a gift. An ear for the symphony of life, an eye for its beauty, and a capacity to feel the wonder of it—what more shall be required than these? We would not trade a piece of string, a bent pin, and the heart of a ten-year-old in springtime for all the profound editorial comment ever written on the glories of the season.

—J. F. Mc.

Photo by Don Carpenter

Likes Early Season

A WORD of congratulation is certainly in order for what you did in the game law change for the 1962 and 1963 season, which permitted small game to be hunted a week earlier than big game.

I own and operate a 285 acre beef cattle farm in southwest Virginia. My farm is fully stocked with 100 head of cattle, but I always set aside a few acres for game. Until the early small game season became effective, I found it almost impossible to get an equal break with my city hunting friends. I usually like to take three or four days' deer hunting, that necessitates staying away from home. In the past, when I did leave for a few days' deer hunting, at the opening of hunting season, my return was most unpleasant. I have witnessed such things as fire in my woodland; turkeys, guineas and domesticated rabbits taken for game; fence broken down and gaps left open, which permitted my cattle to roam in the highway or on my neighbor's property.

This early game season has solved all my problems. The first day of small game season I got an equal start and could stay at home to keep everything on the farm in order. After the first week of hunting the pressure was about over, so I felt it safe to take a few days' deer hunting. On my deer hunt I found another interesting fact. There were no grouse or squirrel hunters in the woods to interefere, because they had already been out enough to get their fever down.

I have discussed this early game season with several farmers who enjoy hunting, and they all feel the same way I do. We farmers want an equal break, and no posters will be erected.

Dana R. Woliver
Pennington Gap, Virginia

INCLOSED find a check for my renewal of WILDLIFE. I neglected to send for it before this as we have been busy moving into our new home we have built by our lake. Some three years ago I fulfilled a boyhood dream by damming the rushing waters of many springs making a lake covering about 15 to 20 acres, which I stocked with 26,000 fish consisting of trout, largemouth bass, red ear and bream. Since I have an even flow of water in and out and the temperature is right, I never have to restock.

The 104 acres of mountain land which was an old orchard affords us a paradise for hunters as there is an abundance of deer, wild turkeys, quail and bear. Also rabbits.

Since we are located only 700 yards from highway 20, 15 miles south of Charlottesville, it is unbelievable such a place exists. I have retired as Chief of Police in Elkton and hope in the near future to open our place commercially.

WILDLIFE has always given me a great deal of pleasure as I have always been an outdoor man.

W. M. Norvelle
Lake Tanglewood
Covesville, Virginia

We think there is a real future in the development of outdoor recreational opportunities as a supplementary source of income in rural areas. Good luck!—Ed.

THE FUTURE OF SPORT FISHING

It is estimated that 10 million acres of new impoundments will be adequate to supply the additional fishing waters required.

THE popularity of sport fishing is increasing by leaps and bounds. If there is adequate opportunity to fish, the number of anglers in our population is going to increase by 50 percent in the next 15 years or so, and by a phenomenal 150 percent by the year 2000. Can the increase in fishing demand be met? The answer is yes, it can, according to a report of the now-terminated Outdoor Recreation Resources Review Commission.

This optimistic report, one of the best special study efforts of the Commission, provides a significant benchmark for future planning by governmental fishery agencies and private recreation and conservation groups. It underscores the importance of acquiring and managing new public fishing waters, and developing public landings and access areas. Fortunately, such programs were initiated in Virginia by the Commission of Game and Inland Fisheries some years ago, and this state is well along the road to meeting its future sport fishing requirements.

The ORRRC study concluded that by the years 1976 and 2000, our population is expected to increase by 30 percent and 98 percent, respectively, over 1960 figures. But by the year 2000 the number of fisherman-days will be three times what it was in 1960. In round figures, 63 million anglers will fish 1,300,000,000 days.

The report asked, can the streams, lakes, and reservoirs of the nation provide these anglers with a satisfactory level of fishing? It answered that in most parts of the country, fishermen will find some waters open to them within an hour's drive of their homes. More and better roads and highways, improved transportation, and new waters in the form of impoundments will make this physically possible. The increase in fishing demand can be met in three principal ways:

Adding new waters. The acreage of new impoundments cannot be forecast exactly, but it is estimated to be 10 million acres, which is considered adequate to supply the acres of additional fishing waters required. This acreage will include half a million new farm and ranch ponds by 1976, and an additional million by 2000. New waters will supply about 34 percent of the increase in fisherman-days beyond the 1960 level. There will be problems created by unequal location of waters in relation to the distribution of human population.

Better management of existing waters. Improvement of existing waters can be counted upon to increase fresh-water fish production by an estimated 23 percent by 1976 and 65 percent by the year 2000. This can be accomplished through applying presently known management techniques and by using knowledge to be gained from research in the years immediately ahead. Better management, combined with the capacity of existing waters to absorb more fishing pressure, will satisfy 30 percent of the increased recreational fishing. The greatest improvement will come in the warm-water fisheries and result from such things as reduction in pollution load, better methods of controlling aquatic weeds and undesired fish species, public acceptance of species not presently utilized, managing waters for maximum fish production, provision of adequate access to public waters, and better information programs to guide the fishermen.

The increase in production traceable to improved management is expected to range up to 100 percent for warm-water impoundments, including farm and ranch ponds. The rate of increase will be substantial, but less, on cold water habitats since many of these presently appear to be receiving the maximum usage that can be provided without losing some of their attractiveness to anglers. This is especially true of readily accessible trout streams.

New opportunities are being developed for fishing in tailwaters below dams where large numbers of fishermen can be accommodated. Information from research projects just getting under way and from those planned for the future will contribute materially to the rise in management effectiveness and in benefits to the angler. Cold water habitats now receive 25 percent of the fishing pressure, warm water habitats 75 percent of the load. The latter will probably continue to gain in percent of fishing supported.

More fishing in coastal waters. Continuing a trend first noted in 1955 and emphasized in the 1960 Survey of Fishing and Hunting, the coastal waters will absorb an increased portion of the sport fishing effort. In 1960, this was about 17 percent of all fishing and is expected to rise to nearly 30 percent by 2000. Marine waters are expected to absorb 36 percent of the increased fishing pressure above 1960 levels. Marine waters can absorb this increase provided the estuaries are not damaged or rendered unfit as spawning and nursery grounds or the migration routes of anadromous and other species blocked by man-made structures. More fishermen taking the species inhabiting coastal waters means less fish per angler in the future, and catches from inshore waters may decline somewhat from the present high levels. The capacity of the open oceans to produce recreational fishing on our present knowledge is almost boundless.

There are problems to be overcome in both fresh and marine waters, calling on many scientific, political, and social fields. Siltation and pollution must be prevented and controlled more effectively where they become seriously detrimental. Present research on sport fisheries must be expanded and new projects started to provide information needed for improved management. The problem of getting more adequate funds for all sport fishery programs will become even more pressing in the future and must be solved. Action programs must be developed to meet these new demands which seem certain to come. The goals can be met if the public is made aware of their importance and the individual citizen can foresee benefits in terms of improved outdoor recreation.

The fishing report states further that there is reason to believe that the projected level of participation will occur if there are places to go and fish to catch; in other words, public use will be proportional to fishing opportunities.

At least 75 percent of the fishing in 1960 was on public waters, and evidence indicates that this percentage will rise in the years ahead. The management responsibilities of the state and federal agencies concerned with water resources will likewise increase, and how well they do their job will determine the level of recreational use, including fishing, which can be provided.

The study team stressed that the level of fishing which can be afforded the public in the future will largely depend upon the advances made in fishery research, including new and improved methods of management, which can be adapted on a wide scale. The cooperative assistance of all those interested in our fishery resources is essential: the landowner, the state government, the federal government, and the individual fisherman—all must operate in their respective spheres to maintain the fishery resource in a healthy status. The responsibility must be shared. The fishery scientist holds the keys to solving the problems, with the solution depending on his wisdom and skill. He must be supported by the landowner, the fisherman, the administrator, and the legal bodies that decide on public programs. Fishery science has evolved through several stages and no doubt will be concerned with many more fields of knowledge and new skills, not yet envisioned.

In coming to its final conclusions and recommendations, the ORRRC's fishing study group listed these items as being the most significant needs of the recreational fisheries of the United States:

Sport fisheries should receive wider recognition as a resource of national significance. The nationwide increase in vacation travel and the pleasure of fishing new waters have awakened a new and widespread public interest, which can best be met by expanded cooperative programs. No one agency can do the job unaided.

Provision of recreational fishing should be recognized as one phase of water-resource management, where all compatible uses are encouraged and developed. On some areas there may be uses of higher significance than fishing; but fishing should be permitted and encouraged wherever it does not seriously interfere with essential uses.

There are three main problem areas in sport fishery management that must be given attention, if the future requirements of fishermen are to be met—

Greater provision for public access to all types of water, whether publicly or privately owned. This also involves parking facilities, boat ramps, sanitary facilities, even shelters and trails for public use.

Correction and prevention of damaging pollution and siltation in all waters. We are still losing inland water areas to pollution as fast as, or faster than, they are being improved. Siltation is a serious problem near urban developments and where outmoded agricultural practices are still prevalent. The estuaries are the spawning and nursery waters for many marine fisheries and must receive greater protection from pollution than at present, if they are to serve the needs of the nation in the future.

Improved financing. Fisherman use is increasing faster than license revenues and much faster than government appropriations for management of resources. The costs of salaries, equipment, and construction items, meanwhile, have risen sharply. At the state level, the situation calls for increases in license revenues, and possible supplemental sources for new funds. For the needed federal programs, the money can come only through increased appropriations supplemented by reasonable user fees where appropriate. The improvement of existing fish habitats through available management techniques is entirely feasible, but will take money and personnel not presently employed.

The need for more facts to guide the management of fishery resources is imperative. The most vital points on which knowledge is needed are as follows: (a) Management of impounded waters, particularly the large reservoirs; (b) new and precise techniques for the control of fish species and fish habitats, to increase the production of desirable species; (c) more effective protective facilities for anadromous species, both upstream and downstream migrants; (d) better understanding of the effects of new pollutants, commercial poisons, detergents, and radioactivity on aquatic life; and (e) knowledge of marine sport fisheries. Although significant progress in fishery research has been made by the states under the Dingell-Johnson program over the past 10 years and by the U. S. Fish and Wildlife Service, much needs to be done.

Strong efforts must be taken to preserve and protect natural shorelines of rivers, lakes, the ocean beaches, and the estuaries from physical damage and destruction. Dredging, filling, channeling, and drainage are destroying irreplaceable wetland habitats, including spawning and nursery areas, along our coasts. Every possible measure must be taken to save these irreplaceable resources for the future.

Waters affording fishing opportunities near centers of population are one of the most critical needs of the fishing public. Legislation concerning purchase or preservation of lands within the areas or "urban sprawl" should include specific provisions for development of feasible impoundments for sport fishing and other recreational purposes. At every legislative opportunity, specific provisions for development of new waters near centers of population should be included as a benefit for present and future generations.

Better management of existing waters can be counted upon to increase fresh water fishing opportunities for the growing population. The greatest improvement will come in the warm-water fishery.

If there is adequate opportunity to fish, the number of anglers in our population will increase by 50 per cent in the next 15 years.

Commission Photos by Kesteloo

Recognizing the growing need for public hunting areas and fishing waters, the Commission of Game and Inland Fisheries began an acquisition program ten years ago and has accelerated its purchases in recent years.

Commission Photos by Kesteloo

Your Hunting and Fishing License:

A GOOD INVESTMENT

By HARRY L. GILLAM
Information Officer

TO the average sportsman, last year's hunting or fishing license means about as much as last week's theater tickets. It was the price of admission and now the show is over. Although there are no provisions for refunds, the hunter or fisherman is apt to benefit for many years to come from his license money invested by the Commission of Game and Inland Fisheries in permanent outdoor recreational facilities.

During the past ten years the Virginia Game Commission has accelerated its land acquisition program to insure public access to suitable hunting and fishing territory. Beginning with the purchase of Hog Island on the lower James River, the Commission has purchased 14 such areas totaling 113,663 acres. They stretch from the Eastern Shore to the most remote mountain regions. They provide the state nimrods with opportunities for hunting deer, ducks, geese, bear, turkey, grouse, quail, rabbits, raccoons, and rails. Fishermen have an equal variety, including the "fish for fun" trout angling to be found on the newly acquired Ward-Rue tract in Madison County. Trout are stocked in suitable streams on many of the areas. Potential lake sites exist on some areas and plans are being made for their development.

Campsites are now found on many of the Game Commission wildlife management areas, and new sportsmen's access roads and trails are constantly being developed. Including lands made available for hunting and fishing through cooperative agreements with other state, federal and private agencies, the Virginia outdoorsman has his choice of traversing 1,866,346 acres of public lands. Habitat improvements for wildlife, and road and trail development for the hunter and fisherman on these areas will pay big dividends in future years as public recreational lands absorb the influx of recreationists to come.

The state's fishermen have not been shortchanged, either. In the way of permanent assets, each of them has a share in the 14 public fishing lakes, totaling 1,327 acres, owned by the Commission. Eleven of these have been constructed since 1940 and the Commission hopes to continue at the rate of one per year, funds and available sites permitting. Top priority is being given to areas with a low ratio of water per capita in order to help spread equal recreational opportunities to all.

The more heavily fertilized of these lakes yield 100 pounds of fish per acre, and some support nearly 100 fishing trips per acre during the season. Improved management methods are helping to provide more and better catches from these and other public waters. Trout fingerlings have been stocked in some of these small lakes with phenomenal growth and high recovery rates. Encouraged by the excellent striped bass fishing created in Kerr Reservoir, biologists are planning some novel stocking experiments which should add spice and variety to the state's fresh-water angling.

Since the beginning of its public water access area program in 1959, the Game Commission has developed 34 of these access areas to serve the state's fishermen, hunters and boaters. Twelve of these are on salt water and the remaining 22 are on fresh water. Eleven of the salt-water sites and nine of those on fresh water have reinforced concrete ramps. The Commission plans to continue its access area development at a rapid pace, calculating that one access point approximately every 10 miles on the state's major rivers will be none too many to serve the anticipated demand in future years.

Access of the public is a major consideration in all land purchases, whether for boat launching ramp, fishing lake, or hunting area. Boat access sites are given priority according to need. Areas where other means of public access are nonexistent are developed in preference to less needed facilities. In the construction of fishing lakes, too, strong consideration is given to adequate access. A 50-foot strip around each lake is required, plus adequate parking area and an access road for permanent public use. Many of the state's wildlife management areas serve as gateways to thousands of additional acres of national forest land beyond, which might otherwise be inaccessible to the public.

The sportsman's license may be pretty well "used up" for this season, but it has bought him the keys to many doors which will open wide for him another year to reveal a chance for wholesome relaxation in an increasingly crowded and complicated world.

Editor's Note: The Commission of Game and Inland Fisheries at its February 23 meeting adopted a proposal to permit the hunting of turkey gobblers in 69 Virginia counties between April 29 and May 4, 1963, dates inclusive, from one-half hour before sunrise to 10:00 a.m. daily, Eastern Standard Time. Bearded turkeys only would be hunted by calling, and the use of dogs or organized drives would be prohibited. If the proposed regulation is adopted at the next Commission meeting, this will be the third year of spring gobbler hunting in the state. In April, 1961, *Virginia Wildlife* carried an article entitled "Techniques of Spring Turkey Hunting," by G. K. Lightsey, Chief Enforcement Officer, Game and Fish Division, Alabama Conservation Department. This expert was chosen to tell Virginia sportsmen about spring gobbler hunting because Alabama has had success with this sport for many years without detriment to her turkey population. Many Virginia hunters have failed to take full advantage of their opportunity the past two years, largely, we believe, because they still are not familiar with the special techniques of spring turkey hunting which are quite different from those that bring success in the fall. For the benefit of those who do not already think they are expert spring gobbler hunters, we present the following extract of Mr. Lightsey's article.

We have had a spring turkey season ever since I can remember. Alabama has the longest open seasons of any state. In some counties we have 53 days of open season in the fall and winter plus 27 days in the spring, which gives us a total of 80 days. We have one of the most liberal bag limits —1 a day or 5 gobblers during the combined winter and spring seasons. Yet our turkey population *continues to rise*, despite the continued increase in hunting pressure.

The identification of the gobbler in the spring is easy. Seldom will a tom under two years of age gobble. All toms of that age will have beards from four to 11 inches long. The beard is a growth of coarse, black hairs that grow from the upper part of the breast and can be readily seen when in shooting range.

To become a successful turkey hunter, one must possess certain qualities not especially required for hunting other game birds or animals. The *most important of these is patience*, and also the ability to *remain perfectly still for a long period of time*.

It is natural for a hen in the mood for love to go to the gobbling tom; therefore, when you imitate the call of his lady love, *don't expect him to come running to you* for, chances are, he will remain in the same vicinity for quite a while. If you have him interested, *no further calling is necessary*. Curiosity will finally prevail and he will come to the exact location from which you have called. *Never move until you are sure he has gone* in another direction. *Never* try to walk up on or flush him.

To hunt turkeys during the spring season, one should always arrive at his hunting ground well before daylight. One of the main reasons for this is that sometimes the toms will gobble before daylight, and almost always before they leave the roost, and you will be able to hear them at a much greater distance at this time of the morning. In a hilly or mountainous country, turkeys are prone to roost in deep hollows, along streams, or hillsides. When flying from the roost, they will invariably fly to higher ground and the gobbler, unless a hen is with him, will work his way to the top of the highest ridges, gobbling as he goes. Thus it is always best to do your calling on the same level *or on higher ground*, preferably on a point or ridge above the turkey.

In selecting a place from which to call, always choose a place in the open that is free from underbrush. Pick a tree or stump as near the size of your body as possible and sit in front of it, facing the turkey. Never hide behind a tree or stump.

In selecting a caller, you will find many types on the market today. I prefer the mouth caller. However, it is difficult to master. For the beginner, perhaps a small cedar box type used with a piece of slate will be better. Lots of practice is required to become proficient with any type caller.

Let's assume that you have your caller, gun, shells, and hunting togs. You have gone into the woods of your choice 30 or 40 minutes before daylight, and you hear a turkey gobble within one-half mile approximately 10 minutes before it will be light. The next thing to do then is to approach as fast as possible and as quietly as possible to within three to four hundred yards. Slow down then and pick your route to within 150 or 200 yards, depending on the terrain. Select your place from which you will call, making sure that you can see at least 40 yards in front of you while sitting. Get comfortable, take your caller and make one cluck, then follow with three yelps, or hen calls, toned down very low. If you do not get an answer, wait three or four minutes and repeat the call a little louder. Then wait for results. The fact that he does not answer your calling is no sign that he will not come to you. Many times I have called to a gobbling turkey and he would quit gobbling, but would come walking or strutting to within range.

One thing to remember when you feel sure that he is heading your way is to be ready to shoot. For a big, clumsy looking bird, they can make an exit very fast indeed and will take advantage of the terrain or trees in doing so.

Never shoot a turkey in the body, as this will only result in wounding him to fall prey to some predator; aim at the head and neck. In order to prevent shooting a turkey too far away, always pick out a tree or group of trees that you are sure is within range before sitting down to use as a guide for distance.

SPRING GOBBLER HUNT:

HERE'S HOW!

Old gobblers are easy to identify in the spring, and are the only turkeys likely to be attracted by an imitation of the hen's call.

Photo by Karl Maslowski

The first in a series of articles on some of the favorite angling hot spots in Virginia.

Photo by Don Carpenter

The season gets under way with a run of large white perch.

POTOMAC RIVER *Bonanza*

By DON CARPENTER
Outdoor Editor, Washington Daily News

THE bait that draws about 100,000 men, women, and kid anglers to the Potomac River during April-May-June each year is a vast horde of spawning fish. These spring fishermen take more than a million fish a year in the waters between National Airport and Chain Bridge or Little Falls. In spite of this tremendous catch, the fishing has not declined over the last half century.

Virginia, District of Columbia, and Maryland anglers constitute a majority in the Potomac palisades area. Others also come from West Virginia and Pennsylvania to enjoy this free fishing, for which no license is required, and no bag, size or season limits are imposed. Any kind of tackle is legal, even dip nets.

This bonanza usually starts the last week in March with the arrival of a white perch run between Francis Scott Key bridge at Georgetown and Fletcher's Cove. This first "run" is usually the largest fish—perch weighing from a half to one-pound each. These jumbo perch like peeler crab, live minnow, or bloodworm baits, fished from a boat on the bottom at Walker's point, a popular hot spot.

At the season's start the Potomac water is usually cloudy, high, and has a swift, dangerous current. You can rent rowboats at Fletcher's Boathouse, New Cut & Canal road, N.W., Washington, D. C. However, fishermen should exercise care in the swift stream, and never anchor the boat crosswise to the current; only anchor from the bow with one anchor. Many have drowned, when their boats swamped while anchored across current. When your anchor hangs-up on the bottom, for safety sake cut the rope with a knife.

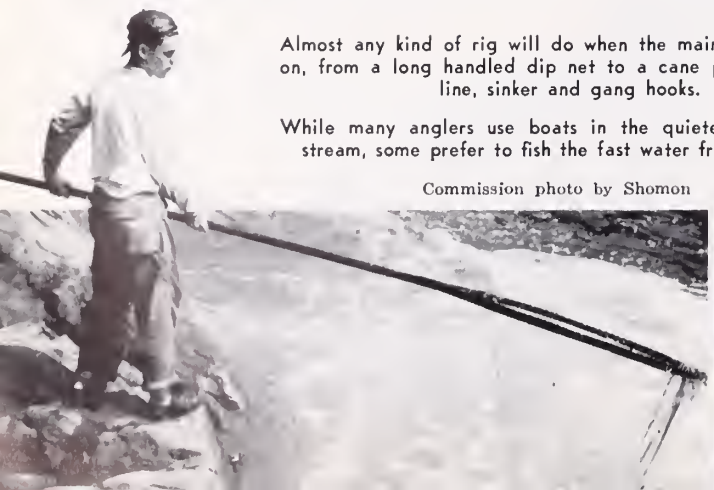
Perching tackle is usually a light bait casting rod, 100-yard size bait casting reel filled with 10-pound test line. A regular 2-hook (No. 4-2-1/0 size) bottom rig with 1 to 2-ounce bank-type sinker. To save lead and hooks at places where the bottom is rocky, use a rubber band to fasten your sinker to the rig.

The perch spawning run lasts until mid-May with the best fish taken before Decoration Day, and only small, or "grass-comber," perch bite from then to mid-summer. Spinning tackle is very popular with perch fans, who take a lot of fish on artificial lures, such as 00-size gold and silver spoons, dart lures. However, the majority of perch are caught with small pieces of bloodworms for bait; it's a waste to use large baits.

White perch bite two at a time, and it's a rare thing that anyone gets "skunked" when the river water is clear. Lots of action is the reason kids and adults like fishing for

(Continued on page 10)

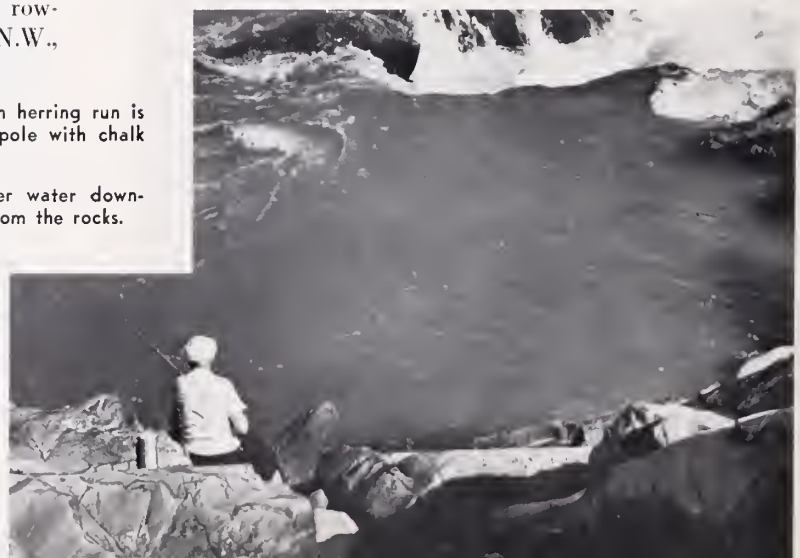
Photo by Don Carpenter



Almost any kind of rig will do when the main herring run is on, from a long handled dip net to a cane pole with chalk line, sinker and gang hooks.

While many anglers use boats in the quieter water downstream, some prefer to fish the fast water from the rocks.

Commission photo by Shomon



LAND-LOCKED STRIPERS DO WELL

Commission photo by Harrison

By ROBERT J. DOMROSE
District Fish Biologist

THE striped bass or rockfish, one of the most valuable anadromous commercial and sport species from the coast of Maine to North Carolina, is becoming a favorite among Kerr Reservoir anglers too.

No other game fish of surf and tidal estuary is able to complete its entire life cycle, from egg to adulthood, in fresh water. Kerr Reservoir is the second of two reservoirs in the country where stripers have been able to respond to a land-locked environment. The first successful striped bass introductions were made in South Carolina's Santee-Cooper Reservoir, where lunkers up to 50 pounds have been creeled.

In 1957, four years after the first introduction of striped bass fry in Kerr Reservoir, fishermen began catching a small number of yearling stripers in the Roanoke River. Since stripers were not stocked after 1955, it was apparent that the yearling fish had been spawned in the reservoir or tributary streams. This led to a series of striped bass spawning investigations on Kerr Reservoir tributaries. Efforts were made to determine the location, time, intensity and duration of striped bass spawning, and to evaluate the effects on striped bass fishing of proposed hydro-electric dams on the Roanoke upstream from the reservoir.

The first few years of the investigation were devoted to egg sampling and locating tributary streams used for spawning. Egg sampling was carried out on four of the main tributaries: the Roanoke, Dan, Bannister and Hyco Rivers. Eggs were found in only two of the rivers, the Roanoke and Dan. Egg sampling success has been many more times successful in the Roanoke than in the Dan River, and it is estimated that over 90 percent of Kerr striped bass spawners utilize the Roanoke River. The reason for this preference has not been determined, but a slight degree of industrial pollution of the Dan River may be a contributing factor.

The spring spawning migration usually begins in late April when water temperatures rise to 58-60 degrees. Males are the first to migrate, followed soon after by the females. The striper travels great distances upstream to spawn and releases her eggs near the surface of the water. The area of greatest spawning activity lies 37 to 43 miles above the reservoir near Brookneal. At the time of spawning, a great deal of splashing and rolling occurs, which is frequently referred to as a "rock fight." This activity is actually spawning behavior and not a courtship act. The eggs are free-floating, slightly heavier than water, and therefore require a certain amount of water flow to keep from sinking to the bottom and being suffocated in the mud and bottom debris. The eggs develop on their way downstream and hatch out somewhere near the mouth of the river. The time required for eggs to hatch is dependent upon water temperatures being about 48 hours at 64 degrees.

A permanent egg sampling station was established in 1961 at Watkins Bridge on the Roanoke River, 16 river miles above the head of Kerr Reservoir. Egg samples are collected daily at four-hour intervals beginning at 6:00 a.m. through 6:00 p.m., for the entire length of the spawning season. The free-floating eggs are collected in funnel-shaped nets 18 inches in circumference suspended from the bridge by a rope and set about midway between the surface and the bottom of the river. The nets are set for a five-minute period, after which the contents are preserved in a quart jar containing 5 percent formalin until they can be separated from the debris (leaves, sticks and other free-floating matter) and counted.

Since the spawning investigation began in 1958, spawning intensity in the Roanoke River (as determined by the number of eggs collected per sample) has been increasing steadily. In 1961, 5,841 eggs were collected at Watkins Bridge on the Roanoke River averaging 13.0 eggs per five-minute sample. In 1962, at the same location, 6,442 eggs were collected averaging 14.3 eggs per five-minute sample and representing an increase of 10 percent over the previous year's average.

The number of eggs found in the nets increased rapidly during the last days of April and hit the high point for the season on May 2, 1962, when the average sample at Watkins Bridge contained 120.5. Tapering off to virtually none a few days later, the samples built up to a minor peak of 31.8, hit bottom again in mid-May, and peaked again at 41.3 eggs per sample on the 18th. By the 22nd, the egg sampling indicated that spawning practically had ceased.

There was a direct correlation between water temperatures and the presence of striper eggs. Up to May 22, when spawning was completed, eggs appeared in large numbers on the days when the low water temperature was 70 degrees or higher. A moderate number of eggs were taken when the

daily low water temperature was 68 or 69 degrees. Practically no eggs showed up when the water temperature dipped below 66 degrees.

Biologists have been highly encouraged by the results of these studies. From all indications this striped bass population should continue to grow and reach its full potential within the next five years.

The greatest threat to the survival of striped bass in Kerr Reservoir is the construction of hydro-electric installations upstream on the Roanoke River. Three power developments have been proposed in the vicinity of the striped bass spawning grounds. These dams could either eliminate the annual spawning runs by blocking off migration routes, or adversely affect water quality essential for egg development and survival of the young fry. Developments of this nature could end striped bass fishing in Kerr Reservoir in a few short years.

Fortunately, the recent Smith Mountain and Leesville projects are located well above the striped bass spawning area so that water quality and quantity will have a chance to recover before reaching the spawning grounds. Furthermore, power company officials have agreed to maintain sufficient downstream water flow during the height of the spawning season to safeguard the spawning success of the striper.

Barring the construction of hydro-electric dams which would interfere with spawning, striped bass fishing should continue to improve in the reservoir and tributary streams.

Potomac River Bonanza (Continued from page 8)

perch . . . and when the run is on, it's a good time to interest children in the sport of fishing. Many families fish right from shore along the river banks.

Right on the heels of the first perch "run" comes the first wave of river herring, usually the first week in April. That is the time when people think of their salt tubs and turn out to catch a supply of herring to "salt-down" for the next winter. They bring gunny sacks, dip nets and "snagging" tackle. They dip from rocky points, at the mouths of small streams or runs, or from points where the current is swift.

The main herring run comes in the last two weeks of April, and the glut of fish is fantastic. Thousands of people dip the roe-filled fish with any kind of net they can find—long-handled jobs with a 4-foot diameter and deep pocket, down to small landing nets. Some even use sieves.

Herring are snagged usually with a long cane pole, a 15-foot piece of chalk-line, heavy sinker and a half dozen large treble or "gang" hooks. The fish are so plentiful it is not uncommon to snag several at a time.

Sportsmen catch many herring with very small darts and spoons (size 0000) by casting with light fly tackle or spinning gear. I think herring taken on Ultra-Lite tackle are as sporty as small tarpon . . . and as much fun as mountain trout.

Many who snag or dip herring use the fresh herring meat for catfish or rockfish bait. Blue and spotted catfish gather in the fish spawning areas of the river to gorge themselves on fish eggs, while large striped bass feed on whole, live herring. So, herring flesh for bait constitutes a form of retribution of some sort.

At the middle of April this area of the Potomac sees the first of the annual shad spawning "run." First arrivals are the "hickory-jacks," a poor to fair food fish, but a fine game fish to catch on dart or spoon lures by casting. Gold or silver spoons in size 00 or 000 are the most popular lures, along with vari-colored regular size darts. Shad casters should use enough sinker 15 inches ahead of the lure to keep the bait deep, but not on the bottom. Work the lure slowly as you reel it in by twitching the rod tip.

All shad are jumpers, just like their cousin the tarpon. Usually, more than half the shad you will hook shake the hook and escape. You will need a landing net to take shad.

Potomac white shad appear in May each year. They are larger than hickory shad, and their additional weight makes them harder to catch. They are the best shad to eat, and their roe is tops at the table.

A popular hot spot for white shad is at "Boiling Rock" in mid-river, just outside Fletcher's Cove below Chain Bridge. Spin-casters "float" or "drift" dart lures in the current by casting, jigging the lure just below the surface of the water, and not reeling in until they get a hit. Shad-rigs consisting of a 00-size spoon, with dart one foot above, are quite effective for bait. White shad hit until July 4th.

Shortly after the first run of perch and herring arrive in early April, and when the river water is reasonably clear, spring crappie fishing starts; large numbers are taken by jigging dart lures or with small, live minnows. Fletcher's Cove and Big Eddy are good crappie holes.

The spring run of striped bass or rockfish in the Potomac above Washington is at its best the last two weeks of May and the first two weeks of June. The school rock usually appear around the first of May—fish weighing from one to five pounds. A few roaster-size stripers weighing 10 to 20 pounds or even larger are taken each spring . . . sometimes as early as mid-April.

All kinds of tackle are used to catch rockfish, and the most effective baits are bloodworms, spinners baited with bloodworms or a live minnow, and fresh-cut herring. Roaster-size rock like a whole side of fresh, bloody herring or a belly-point worked near bottom in the current. Rig it with your sinker 3 feet above the bait. Keep it moving!

Slabs of fresh herring will also catch lots of one- to five-pound catfish and a few catties weighing up to 25 or more pounds.

Among the best places to catch cats are Pumphouse Cove, Dixie Landing, The Flats, Bush Eddy, and along the edge of the main river current. I like fishing from a skiff, but many catfish pros angle from both the Virginia and District shores.

Among the more than two dozen kinds of fish that can be caught in this stretch of the upper Potomac are largemouth and smallmouth black bass; rockbass; yellow perch; sunfish; suckers; stonerollers; millroach; carp; smelt; walleye; chain pickerel; and, in past years but seldom seen now, sturgeon.

The spring fishing pressure is heavy; so if you want one of the less than 200 available rental boats, you will have to arrive at the liveries before sunup. If you do not wish to have your ancestors traced back a long way in the most profane language, don't run your outboard motor fast near a fleet of anchored fishing boats. There is plenty of fun for everyone, so be a sport . . . and, above all, a gentleman.

NATIONAL CHAMPION CROWNED AT HAWFIELD

McCaskill's Mr. Ranger, National Open Shooting Dog Champion, and his handler, Arthur Bean of High Point, North Carolina.

Commission photo by Kesteloo

By TRUMAN F. COWLES

Chairman, Association of New England Field Trial Clubs
Manchester, Connecticut

McCASKILL's Mr. Ranger, white and liver pointer dog who will be four years old on March 29th, captured the important title of National Open Shooting Dog Champion in the second running of this tremendously successful stake at Hawfield, near Orange, during the week of December 3rd to 9th inclusive. The young champion, no stranger to the winners' column, is owned by L. F. McCaskill, Jr., of Rockingham, North Carolina. He was handled by Arthur Bean, popular professional from High Point. In annexing the diadem, Ranger ran in the final brace Saturday afternoon, the sixth day of running, establishing his claim to the winner's purse of $1500 with a fine hour and a half of range and pattern in accordance with the highest published standards for this national event. He found and handled to perfection five coveys of birds during his heat, had a voluntary back to his bracemate and overcame the slight stigma of an unproductive, which may well have been fully explicable in the light of its circumstances. Judges Harold Crane of Port Republic Maryland, and Les Tichenor, Jr., of Far Hills, New Jersey, conferred the title at the conclusion of the first series which had seen a field of 55 competitors seek the crown.

After last year's spectacular and highly successful inaugural event, it was not an easy task to surpass that beginning in staging this championship for the second time. Although the field was slightly smaller (by four dogs), the caliber of competition was generally higher and the polish acquired after the experience and background provided by the first running was apparent. There can be no doubt that the stake has become definitely established as an event of national import, or that the men behind the promotion are dedicated to glorifying the right type of competitor for this class of action. They are leaving no stone unturned to provide the perfect setting in which to elevate the worthy aspirant to a place of national prominence in the bird dog world.

It is with a feeling of genuine humbleness that an attempt is made to describe the famed Hawfield as a background for this national championship stake. The features of this terrain are widely known to thousands of field trialers, who have made pilgrimages to the site in its more than a score of years of usage for premier bird dog events. Located within the confines of the town of Unionville, about eight miles east of Orange, where field trial headquarters traditionally are maintained, it is owned and maintained chiefly for field trial purposes by its beloved "Squire" Guy Lewis, Jr. Geographically it is laid out in an extensive valley, bounded on the west by two of the mountains of the Clark range, and on the east by lower rolling hills. The entire plantation, although some pasturing and feeding of beef cattle is carried on, is managed primarily for propagation of bobwhite quail and the running of field trials.

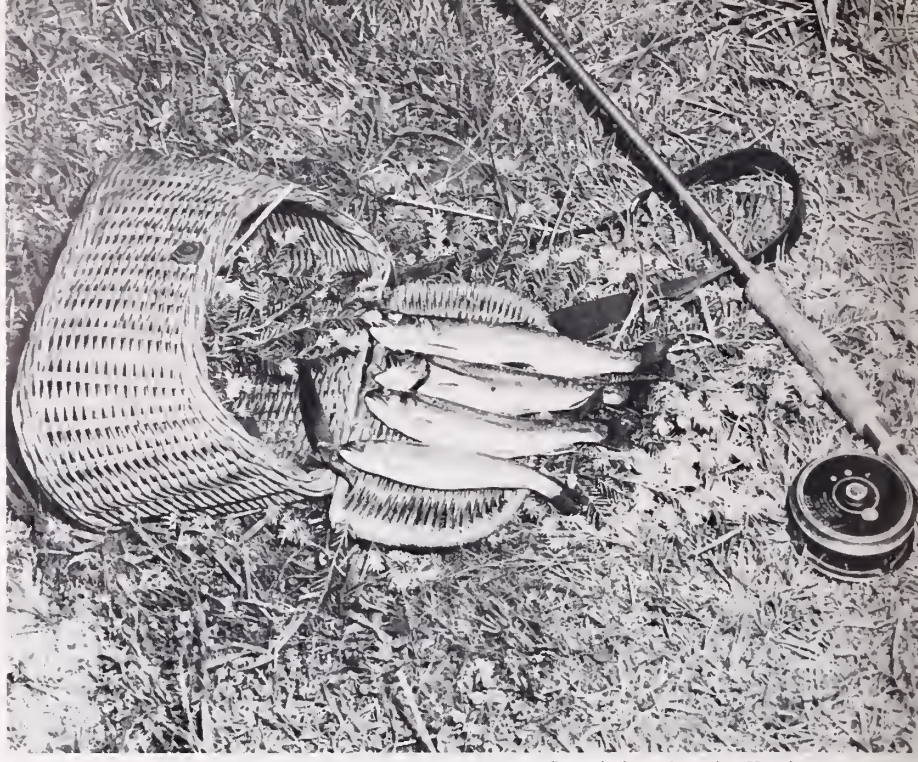
That Hawfield has been the site of several National Championship trials of one classification or another, and the traditional home of the famed Virginia Amateur Association, is ample testimony that it is one of the great trial sites of our era. For the second year in a row, not a single brace went the route without registering definite contacts with birds. Although individual day-to-day tabulations did not reach the high point of last year's first day, when 24 coveys were moved, the same daily tabulation showed a more even distribution and availability from beginning to end. Actual count of coveys found or ridden up by days were as follows: Monday—10; Tuesday—13; Wednesday—17; Thursday—11; Friday—14; Saturday—15; Sunday—9. Additionally this year, though scattered reports had them present last year too, we saw pheasants on several occasions: only a few birds, but two were pointed and handled by the competitors. The area is abundant in other game, too. A wild turkey, sighted along a woods' edge as we were deadheading in from the completion of one brace; several deer, one a magnificent buck with a real trophy rack; a raccoon; a woodchuck; and a fine bushy red fox, all put in an appearance and added to the colorful background of the trial.

At every hand is evidence that this field trial paradise is in a constant state of improvement and progress toward making it an even more ideal testing grounds for bird dogs. A tremendous tribute is due owner Lewis and his cohort Parke Brinkley, whose foresight and constant vigil have brought such success in this endeavor.

Two courses, each an hour and a half long were run over twice a day, once in the morning and once in the afternoon. Course number one started a short distance from the barns and kennels; led upward and left across the plateau on the top of Little Mountain, back down the slopes to across the famed "Bowling Alley" with Mountain Run in its center, up the opposite slope and right to hedgehop across a series of ridges and hedgerows to the southern end of the plantation, and right in a gradual loop back across fairly level but segmented terrain. This course concluded by recrossing the "Bowling Alley" and looping northward in a sort of figure eight maneuver. Course number two started just north of the Grange building and bore left slightly; turned to cross the hardtop road and go east over rolling ground; looped to the right and crossed the creek; led left across a corn plot

(Continued on page 21)

Dollars and cents considerations alone limit the number of trout per fisherman that can be raised and released annually.



Commission photo by Harrison

TROUT REPORT

By ROBERT G. MARTIN
Chief, Fish Division

MOST of Virginia's 75,000 trout fishermen already have marked the date on their calendars. On April 6, at high noon, you should be able to find most of them scattered about on some 200 streams in 39 counties, each eager to land the first trout of the 1963 season.

It is unfortunate, but true, that our trout streams do not have the productivity and year 'round holding capacity to furnish fishing for such a multitude through natural reproduction and survival. While many anglers, in theory, prefer "natural" fishing to "put and take," trout fishing in Virginia as it is practiced today simply could not exist without the support of a vast hatchery and restocking program. Actually, less than five percent of our trout fishermen really try to ignore hatchery fish and concentrate their efforts on the native trout in small headwater streams. More power to them! But even they depend on the stocking program to a greater extent than they may realize. Were it not for the spring release of thousands of trout in other, larger streams, the pressure on the true native fish in the few year 'round trout streams would be unendurable for fish and fisherman alike.

About 97 percent of the trout fishermen utilize put-and-take waters. They prefer live bait to artificial, and they play for keeps. To make them happy, approximately 410,000 brook, brown and rainbow trout have been stocked throughout the state's trout range. An additional 250,000 will be stocked during the May closed fishing period, and 88,000 will be released during the summer months, in order to spread good fishing success over the longest possible period of time. It takes just about two week ends after a stream is stocked and opened to fishing to produce a very noticeable slump in fishing success.

Some ninety percent of this year's fish are yearlings. The other ten percent are two-year-olds, just to make things more interesting.

The cost factor alone precludes further expansion of our trout stocking program at present. Even with improved hatchery management and greater emphasis on stocking yearling trout, which have reduced the cost per trout by half during recent years, trout rearing expenditures still exceed trout fishing revenues. Efforts are being made to

(Continued on page 19)

Commission photo by Cutler

Commission photo by Kesteloo

Commission photo by Shomon

Noon, April 6, will find a large proportion of Virginia's 75,000 trout fishermen on the banks of some 200 stocked trout streams.

(Right) Even the "loner" who sticks to small, "native" headwater streams benefits from trout stocking.

(Far Right) About ten per cent of the stocked trout are two-year-olds, just to make things more interesting.

VIRGINIA WILDLIFE ☆ ☆ ☆ ☆

CONSERVATIONGRAM

Commission Activities and Late Wildlife News . . . At A Glance

EITHER SEX SHOOTING BOOSTS STATE DEER KILL. In spite of a sharp drop west of the Blue Ridge, the 1962-63 Virginia deer kill hit a new record mark of 38,701, an increase of 2,585 over the previous high mark of 36,166 set two years ago. The increase could be attributed almost entirely to the liberal either-sex seasons which were in effect in all but two of the eastern counties. The 24 counties which jumped from bucks-only seasons in 1961-62 to either-sex shooting last year showed a gain of nearly 10,000 in the number of deer killed. Although this was spectacular, either-sex shooting usually yields three to four times the harvest achieved with bucks-only seasons.

Not so spectacular but probably more important to the deer hunter was the fact that in 30 eastern counties which had liberal either-sex seasons in 1961-62 as well as last year, the kill nearly held its own dropping from 10,767 to 10,660. Technicians point to this as strong evidence that either-sex shooting can continue at this rate in future years without decimating the herd. The most spectacular increases were noted in Albemarle, Amelia, Buckingham, Charles City, Fluvanna, New Kent, Nottoway, Powhatan and Prince Edward Counties where the kill more than tripled. A marked increase occurred in 12 more of the 55 counties which comprise the eastern portion of the state.

Biologists report that range conditions are good throughout most of eastern Virginia and should continue to support high kills like these chalked up this year.

NEW RECORD ESSAY TOTAL. The 16th Annual Wildlife Essay Contest sponsored by the Virginia Game Commission and the Virginia Izaak Walton League ended January 15 with a new record total of 13,684 essays. These compositions on the theme "The Importance of Conservation Education in the School Curriculum" were submitted by Virginia school children in grades 5 through 12. Entries were received from 183 of the 331 Virginia schools which entered the contest.

Students are competing for $3,000 in prizes, the biggest of which is an $800 scholarship to the college of the winner's choice. Other prizes include $50, $25, $15, $10 and $5 awards for outstanding essays in each grade level. The smaller awards are apportioned according to the number of entries from each grade. The ninth grade showed the most interest with 2,630 entries followed closely by the eighth with 2,337.

Fourteen schools had 100% participation in the contest by their students. Entries were received from 106 Virginia cities and counties. The total entries exceeded last year's record by approximately 4,200 essays.

Winners of the grand prize awards and representatives from 100% schools will be guests at official presentation ceremonies at the State Capitol in Richmond the latter part of April. The Governor customarily presents the awards personally. The Richmond Izaak Walton Chapter plans an outdoor dinner and festivities for the winners at its park near Midlothian following the ceremonies at the Capitol.

WHOOPING CRANES DOWN. The total number of whooping cranes in North America, which has been on the rise since 1956, seems to have dropped back to its 1959 level of 32 birds from its peak of 38 last winter, according to a U. S. Bureau of Sport Fisheries and Wildlife report.

The total of 32 birds was seen in the vicinity of the Aransas National Wildlife Refuge in Texas on December 7, 1962, by an aerial census team which also reported the unconfirmed sighting of an additional bird on a ranch to the east. No young birds of the year have been seen this winter.

The wild whooping crane population has built up from a low of 21 birds in 1954. There are also seven whooping cranes alive in captivity, one in the San Antonio Zoo and six at Audubon Park, the New Orleans Zoo. Although the parent birds at New Orleans laid six eggs in 1962, no young birds survived.

Don't let all the small pieces fool you. It's not as hard to put together as it appears. Hemostats, scissor-like objects lower center, came in handy but are not absolutely necessary.

The chassis assembly (right) contains almost all of the wiring and is bolted to the cabinet bottom shell (left). Construction makes maintenance and adjustment easy.

Do-it-Yourself

A SAGE chronicler once said, "He who is his own lawyer, hath a fool for a client." Perhaps this was once true. Perhaps it is true now. If this is so, then the world is inhabited solely by fools, for this is the era of the do-it-yourselfer. Since the end of our late great hate, World War II, more and more of the commodities that used to come to us as finished products are now found in multitudinous small pieces, "ready to assemble." Cost of labor in the United States has skyrocketed in the last 15 years and so, according to all economic axioms, has the cost of consumer products. With the man-hours spent in assembling a product—particularly one that is intricate—dispensed with, the price of said product is substantially reduced.

Boating offers a tremendous opportunity for the home craftsman. It could be considered his dream come true. Boat dealers abound and kit boat manufacturers abound in boat dealers' catalogues. Much of the equipment in a boat can be constructed at home during the long cold winter. Besides saving money, it enables the boating enthusiast to take part in a marine activity while the boat waits high and dry on its trailer in the backyard.

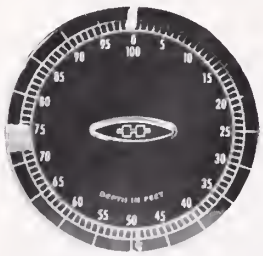
One of the most useful and interesting of the marine kits is the ultrasonic depth sounder. In essence, this instrument transmits high-frequency sound impulses from a transducer mounted in the hull, measures the time lapse between the transmission and the echo from the bottom and indicates on a circular calibrated dial the depth in feet.

The idea is not new. The 1914 graduating class of the Friend's School in Washington, D. C., heard a lecture by Alexander Graham Bell on water's efficient transmission of sound. The bearded inventor suggested that the increased speed of sound under water (averages 4,920 feet per second) be put to some practical use. What the venerated doctor did not know was that three years earlier a French and Russian physicist team had succeeded in building an ultrasonic detector and had even tracked a submarine cruising under the harbor in Brest.

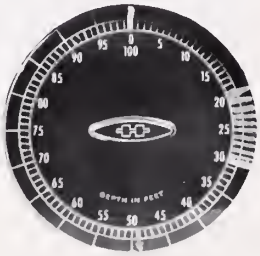
To the average man this sounds like a project a little too complicated with electronic and mathematical problems to attempt. Nothing could be further from the truth. The fact is that even with no knowledge whatsoever of electronics, a person can build and use the Heath MI-10 Depth Sounder. All that is necessary is that you be able to solder a neat joint. Believe me, this is about the extent of your reporter's knowledge.

Upon unpacking and sorting the kit, you will be impressed by the fact that all metal parts subject to salt water corrosion are either painted or plated with cadmium, zinc, or nickel chromium. The cabinet is tongue-and-groove constructed making it relatively splash proof. The transducer is supplied with a through-hull fitting of brass and is attached to 15 feet of waterproof cable. The 33-page construction

During proper operation there will be a light on the zero mark of the depth sounder and another at the indicated depth.



Here we see how a bottom would look when there is about three feet of mud or muck over a hard bottom at seventy-five feet.



Seaweed, growing on a thirty foot bottom would give this kind of picture. The seaweed is two to twelve feet tall. Submerged trees and limbs of trees would give this type of indication too.

Here is how a school of fish would look on the depth sounder. Fish are at 17 to 22 feet, bottom at 75. The indication may be momentary or prolonged depending on how large the school is. A momentary "blip" at this depth could indicate a single large fish.

manual suggests that the tools necessary are: two screw drivers 1/4" and 1/8", long nose pliers, wire cutters, a pen knife and a soldering iron with rosin core solder. The author found that two small surgical hemostats, while not necessary, came in handy for holding small parts. A pair of pliers with a rubber band around the handle would serve the same purpose. The six-transister circuit is powered by six 1½-volt "D" size flashlight batteries supplied, lasting from 25 to 50 hours and making it completely independent of any outside source of electricity. This feature allows it to be used on even the smallest rowboat or canoe. The casual fisherman can best take advantage of this feature.

The assorted parts were stored in a 12-well muffin tin during the actual construction of the kit. The sloping walls of the tin made it easy to pick up some of the very small parts such as #3 lockwashers. Little aids like this can speed up a job considerably. If you have any doubts about that,

The completed MI-10 depth sounder makes an attractive addition to the cockpit or wheel house of any boat. The bracket enables it to be mounted in any position.

Depth Sounder

By RONALD F. MARION
Richmond, Virginia

With photos by the author

how long did it take you to hook that little hook and eye thing on the back of your wife's dress last time?

It was found that as long as the directions in the book were carefully followed, no troubles were encountered. As soon as I became a "thinking man" though, I ran into trouble. Wires were too short or a terminal was soldered only to find that later on another wire had to be attached to it. It is impossible to conceive of how the directions could be any simpler or more concise. It is not necessary to know how to read a schematic diagram. Fold-out, enlarged illustrations show where each wire and every resistor is to be placed. Numerous small illustrations explain the construction of details that are not made too clear in the larger diagrams. The time necessary to construct the instrument came to about nine hours. It shouldn't happen, but if for some reason it doesn't work when you finish, there is a trouble shooting section in the back of the manual. The only serious problem a tyro could run into is the off-chance that one of the parts could be defective. Should this occur, the manufacturer will send a replacement part upon notice of the problem. A technical consultation department, maintained by the manufacturer, stands by to solve any other problem that may turn up.

After completing the project and recovering from the shock that it actually ran when the batteries were inserted and the switch turned on, your reporter made a three-block walk to the local Y.M.C. pool to actually wet the transducer. Any doubt about the practicability of home-made depth sounders was quickly dispelled by two bright "blips." One right on the zero line and another on the 10-foot mark. The next trip was to a lock in a nearby canal where the water was somewhat deeper. With a little coil adjustment, as per the instruction manual, an accurate 30-feet was recorded.

The uses of depth sounders are many and varied. The most obvious application on a large boat is the ability to "see" the bottom and avoid running aground. Utilizing charts with depth markings, computed magnetic courses can be cross checked by depth readings. The shape of the blip will indicate the consistency of the bottom. A fuzzy indication on the dial is indicative of a soft mud bottom, where a hard one is shown by a sharp narrow blip. Seaweed will show up as a long hazy line ending in a sharp one which represents the bottom. After a while the bottom can be "seen" with great accuracy. Fishing holes can be found and even the air sacs in large fish or schools of small ones are evident.

On larger boats, the transducer is mounted through a 3/4" hole in the hull. Those who have smaller boats or no boat at all and intend to rent one should rig some sort of outboard bracket for the transducer. Wood, aluminum pipe, or even aluminum strap bent to shape would serve the purpose. A makeshift arrangement of this sort was fashioned from eight feet of 1/4" x 1" aluminum bar stock. A three-foot section was bent to a top-heavy L shape. The bottom leg was 1½" long. A 3/4" hole was drilled in the resulting foot and the transducer bolted in the hole. A five-inch wood filler was wedged between the transducer shaft, and the long leg and the whole works was taped with rubber tape for strength. One-quarter inch holes were drilled every six inches so another L shaped strap could be bolted at any height to allow for differences in freeboard. The second L was clamped to the gunnel of the boat. If the MI-10 is to be used on only one boat, a better fitting could be fashioned. The transducer should be at least three inches under water and pointed straight down. A portable depth sounder could be a part of every fisherman's tackle box.

The dividend from nine or ten hours of pleasant work is a better equipped boat, more accurate navigation, a sense of confidence about the safety of you and your family, and last and by far not least for the outdoors man, a full fish box.

PROPAGATION of GAME BIRDS

By DENNIS HART
Game Farm Manager

Kalij pheasant.

Iranian blackneck pheasant.

Game Breeding Principles and Objectives

Introduction

First and foremost in the mind of any prospective game breeder must be his ultimate purpose. The stock which is best suited to the pan often lacks the plumage admired in ornamental flocks, and both are apt to be second rate for game purposes. The old rule of "like produces like" is the game breeder's basic guide line. Healthy, well developed and constitutionally normal breeders are essential to any line of endeavor. In raising fancy birds, the breeder will select for color, pattern, conformation and tameness. When rearing for culinary use, conformation, weight and tameness will be the important considerations.

The preservation of wildness

Actually the above are secondary to the business basically indicated by the terms game breeding, game farming, or shooting preserve operation. Sportsmen place a high premium on wildness and gaminess, and it appears that operators who provide excellence in these qualities will have the most enthusiastic clientele.

English methods of game breeding included the practice of periodically obtaining new breeding stock by hatching wild-gathered eggs at the game farm. Most modern game breeders emphasize selection of breeding stock on the basis of normal health, development, size, conformation and alertness with the gamiest bird of the field as the prototype. When chicks hatched from wild salvaged eggs are placed in a brooder with chicks of a captivity developed strain of the same species, the difference in wildness is usually noticeable down to the last bird.

Quail and pheasants are largely creatures of instinctive and physical reactions. Instincts include, for example, tendencies to react defensively to dangers in the wild. It is not the accumulation of large memory reservoirs of experience that is important to their survival, but rather that they have normal instincts and a physical capacity to react to these instincts. Therefore, it is essential for the ultimate in gaminess that quail and pheasants have the opportunity to nurture these instincts and to develop the physical stamina and coordination necessary for survival in the wild. This is especially important during the formative period which includes at least the first six weeks of life. This type of treatment permits early transfer to the coverts or conditioning pens and favors optimum after-release adjustment to natural dangers.

High egg production as a breeding quality indicates a degree of domesticity that does not go with gaminess. Pure wild strains will not lay over the equivalent of two or three clutches per season. Pheasants and quail have been bred to produce almost an egg a day throughout the year under forcing conditions of artificial lights and other devices. Such strains might be of prime value to the food grower but would be little better than poultry for the hunter.

The problems of inbreeding

Every game breeder is interested to some extent in the question of mating of closely related individuals better known as inbreeding. Outbreeding is desirable when convenient and when quality stock is available for mating with the home stock. In Virginia's exotic game bird introduction program, inbreeding has been unavoidable because breeding stock had to be increased over a period of years from one small importation. No weaknesses have been discernible in the chicks hatched by bantams from eggs taken during the first two breeding seasons for each species. Inbreeding accentuates both the common weak and the common strong characteristics, resulting in a slightly increased early mortality in the progeny but enhanced survivability in the mature crop.

The Mechanics of Production

Mating and facilities

Breeding pheasants are penned either in harems or colonies. In either case, breeding ratios as shown in Table 1 should be followed. All of the species listed breed and produce normally as one year olds.

Table 1—OPTIMUM BREEDING RATIOS

Species	*Hens*	*Cocks*
English ringneck pheasant	5	1
Chinese ringneck pheasant	5	1
Iranian blackneck pheasant	4	1
Chinese ringneck hens and Iranian blackneck cock, cross matings	4	1
Japanese green pheasant	3	1
Reeves pheasant	7	1
White crested kalij pheasant	1	1
Red junglefowl	7	1
Black francolin partridge	1	1

In starting with new strains or small numbers of pheasants, harem matings usually give best results. In large scale operations with the wide ratio species, colony matings are satisfactory and more economical. An exception would be the Reeves pheasant whose cocks are inclined to fight. Blackneck

Red junglefowl.

Japanese green pheasant.

SOME EXOTIC GAME BIRDS BEING PROPAGATED EXPERIMENTALLY AT THE VIRGINIA GAME FARM.

Black francolin partridge.

pheasants, green pheasants and junglefowl could be expected to produce satisfactorily, as do ringnecks, in 150 foot square breeding fields containing 100 hens and 20 to 25 cocks. These pens are open-top with poultry netting sides six feet high and having buried vermin wire (one-inch wire mesh netting) extending about 18 inches up the sides. Clipping one wing of each bird prevents escape from the pen. Extreme vigilance is necessary to prevent egg predation by crows, blue jays and other predators. In either colony or harem type pens there must be a wide distribution of food, water and cover. If cover is inadequate for low caste individuals, they will be persecuted with resulting lowered production and possible mortality.

The harem type pens used by the Virginia Game Commission are 9 x 12 x 6 feet high. When using this type the mated groups should be placed in them in the breeding field about six weeks before the normal commencement of egg laying. In Virginia, breeders are put out about the middle of February. Some of the breeders are held over winter in mated groups in the breeding field. The pens for these are moved to fresh ground during the last two weeks of March. Any below-par individuals not previously noticed are at this time replaced. These 9 x 12 foot pens may or may not be moved again before the end of egg laying, which is about the last of June with the wilder strains. The kalij and francolin pens, usually containing only a pair of birds, are allowed to remain unmoved until after egg laying. Plant growth in these pens will hold its own. Herbage in the pens, particularly clovers, will be beneficially utilized by the breeders. Pens containing four or more birds usually need moving to fresh ground during the egg laying season. A 30 inch deep, ½ inch mesh dip net having a 40-inch handle is used to catch the birds. It seems to cause no appreciable curtailment of egg production.

Control of pests and disturbances

Routine feeding and associated functions by familiar caretakers does not constitute a serious disturbance. However, disruptive excitement results from passing sightseers, playing children, free roaming cats and dogs, and from harassing hawks and owls even through these predators cannot actually get among the birds. Fencing or equivalent protection must be provided to keep people and dogs away from breeding stock or egg production will be drastically curtailed.

Louse infestation will play havoc with egg production. Lice tend to be spread throughout overwintering quarters by intruding starlings, sparrows and other seed-eating birds. No adequate control for starlings has been found. Trapping, poisoning, or fencing them out has met with only limited success. Particularly during periods of snow, they infest the game farm by the thousands. Harassment with shotguns has generally discouraged them and caused them to move elsewhere.

Breeders should be individually deloused before egg laying is begun. The old reliable sodium fluoride remedy is recommended. Malathion powder tried experimentally resulted in serious curtailment of egg fertility.

Mated groups are placed in pens in the breeding field about six weeks prior to commencement of egg laying.

The best breeder selection and management is futile unless eggs are properly handled, stored and incubated.

Collection and care of eggs

The gathering of eggs three times a day has given no noticeable disturbance effects when carried out with proper decorum by regular caretakers. Prevention of embryo mortality due to sun scald has justified the three collections.

The best of breeder selection and management is futile unless eggs are properly stored and incubated. Eggs are quickly cooled in a mechanical egg cooler and stored in egg cases. Cooler temperature is maintained at about 55 degrees F. with relative humidity at approximately 80 percent. Pivotal tilting of the storage cases each day provides proper egg turning. Embryonic deterioration accelerates after one week of storage, so accumulated eggs should be transferred to the incubator weekly. Eggs should be removed from the cooler and allowed to warm up to room temperature before being moved on into the incubators. All incubation and hatching instructions of the manufacturer of each incubator should be carefully considered. They have been based on thorough experimentation. If instructions are not given for game bird eggs, then some operational adaptations will have to be made.

Incubation

In working with exotic strains, some of these never having been propagated artificially, much essential technical know-how has to be developed experimentally. For this reason much initial incubation of these new species has been done with bantams. Good bantams almost invariably hatch 100 percent of fertile eggs. The chicks pop out all at once and are without flaw or blemish. The incubation period is recorded to the hour, and each clutch of eggs is weighed three times during the incubation by the bantam to compute the normal weight loss percentage. These findings are the standard for subsequent artificial incubation. Incubation temperatures and humidity are correlated to bring hatches out at the same day and hour as proven optimum under bantams. Some experimental incubation data is given for Iranian blackneck pheasants, Japanese green pheasants and black francolin partridges in Table 2.

Correctness of humidity can be evaluated to some extent by observations as to the condition of the eggs and embryos at the end of the hatch. If the chick pips the shell and dies in that position, with a sticky mass formed around the beak, it indicates too much moisture during the incubation period. The egg did not dry down properly, leaving a fat pudgy chick too weak and too large to be able to turn in the shell and work its way out. On the other hand, if too much moisture has been evaporated, the chick will pip but there will not be enough liquid or lubricant to allow the chick's body to turn in the shell and make a complete circuit. Candling the eggs periodically during incubation to evaluate the growth of the air cell will aid in dictating proper humidity control.

Avoid opening the hatcher door to observe the progress of the hatch. This disturbs the moisture buildup and introduces chilling drafts. Experience will tell when to expect the hatch to be completed and the chicks dry and fluffy, ready for removal. Don't remove the chicks while wet. The accumulation of chick down or fluff at the vent openings (outside) will also be an indicator.

The selection of top quality breeding stock virtually eliminates inherited weaknesses such as crooked toes and spraddle legs. Crippled birds are seldom hatched under bantams, but artificial incubation results in some. At the Virginia game farm practically all fertile eggs set under bantams hatch. The over-all hatching percentage with fertile eggs hatched in incubators is about 74.6 percent.

Egg turning must be done carefully. It is possible in some incubators that the mechanical turning device will not be functioning and the operator could overlook this for awhile. In turning by hand be careful to turn the eggs onto the opposite side rather than to make complete rotations. The sides that were up should be turned down.

Ventilation, too, is very important both to support respiration in the developing embryo and as a factor in the control of incubator temperature and humidity. Since incubators vary so much in mechanical provisions for ventilation, the manufacturer's instructions must be carefully followed.

Incubators can be fumigated while operating and loaded with eggs using six teaspoons of potassium permanganate to five tablespoons of formaldehyde. The formaldehyde is placed in a bowl on the floor of the machine and the permanganate of potash crystals added just before closing the machine. This solution is left in the incubator for 15 minutes, then removed and the vents opened so that the gas can escape for about three minutes. The vents are then closed again so the machine can return to normal temperature. Each setting of eggs should be fumigated only once. Since eggs are usually set each week, one fumigation every three weeks can be arranged to catch three settings, the latest setting just after its start and the earliest setting just before its transfer to the hatcher.

The hatcher needs to be scrubbed and fumigated after each hatch is removed. For this the formula is four teaspoons of permanganate to four tablespoons of formaldehyde. This fumigant should be left in the hatcher from ½ to ¾ of an hour. The vents should not be opened unless eggs are to be placed in the hatcher immediately.

Table 2—INCUBATION RECOMMENDATIONS

	Iranian Blackneck & Versicolor Pheasants	*Black Francolin Partridge*
Incubation Period	24 days	19 days
Incubation Temperature (forced draft)	99½°F.	99½°F.
Incubation Temp. (still air) Bottom of thermometer bulb level with top of eggs, not closer than 1 inch to any egg.	102½°F.	102°F.
Weight Loss Under Bantams	13.8%	12.9%
Incubator Humidity (forced draft)	83°F. (wet bulb) 50% Relative Humidity	83°F. (wet bulb) 50% Relative Humid.
Incubator Humidity (still air)	55-60% Rel. Humid.	55-60% Relative Humidity
Hatcher Temperature (forced draft)	99½°F.	99½°F.
Hatcher Temperature (still air)	102½°F.	102°F.
Hatcher Humidity (forced draft)	87°F. (wet bulb) 63% Rel. Humidity	62.5% Relative Humidity
Hatcher Humidity (still air)	55-60% Rel. Hum.	60%+ Relative Humidity

Note: Allow humidity to increase at hatching time as a result of the release of moisture from the hatching eggs.

TROUT REPORT (Continued from page 12)

effect further economies, but present trout revenues cannot be expected to provide for more than about eight trout per fisherman per year. However, there are several ways in which available numbers of fish are being utilized to provide greater returns for the anglers in the form of higher quality fishing spread over a longer period of fishing time.

Combining in-season stocking with pre-season stocking has proved successful in adding to the number of successful fishing days without causing much of a reduction in the average daily catch. Experiments with brown trout promise a similar effect. These fish are not as easily caught on opening day as are hatchery-reared brooks and rainbows, and by remaining in the streams they should make fishing attractive over a longer period of time. Experimental brown trout stocking has been expanded considerably this year. The release of 40,000 browns in 1963 should tell us a lot more about what part this fish should play in future stocking plans.

The fish-for-fun area on the Rapidan and Staunton Rivers has proved successful in providing more quality fishing within the quantitative limits of our resources. Here, in cooperation with the Shenandoah National Park, waters have been set aside for fishing only with artificial lures and barbless hooks, and all fish taken must be returned to the water immediately. Hundreds of successful fishing trips on these waters are provided annually, and both the native brook and introduced rainbow populations have fared quite well. We hope for an increasing build-up of really large sized trout in this area in a few years, as well as increased utilization of fish-for-fun facilities by trout fishermen.

The "two story" fish management initiated at Lake Shenandoah (described in detail in the March issue of VIRGINIA WILDLIFE) has resulted in attractive trout fishing in what is essentially bass and bluegill water, thus stretching further the "mileage" Virginia is able to get from her available trout-rearing facilities.

Probably the most spectacular result obtained to date from various trout stocking innovations was a "run" of rainbow trout weighing three to five pounds in Philpott Reservoir last November. Over 100 of these beauties were taken in the shoal waters of this impoundment as they attempted to spawn. These fish originated as fingerlings released experimentally in the fall of 1960 and 1961. Their rapid growth apparently is the result of an abundance of threadfin shad, a small forage fish. The threadfin shad also is stocked in Philpott, where it reproduces rapidly through multiple spawnings during the summer but does not overpopulate the water, as so many other rough or forage types do, because it does not survive the winter. This highly successful experience with fingerling trout in Philpott will lead to similar efforts in other impoundments.

Trout fishing in Virginia is, unavoidably, about 95 percent artificial, and artificial propagation of game species, be they birds, mammals, or fish, is expensive. The only limit on the trout program is the cost the trout fishermen are willing to bear. Every effort is being made to stretch the dollars, and the fish, as far as they will go. Some imaginative innovations have proved successful. There are others still to come. In the meantime, three quarters of a million brooks, browns and rainbows await your pleasure for the 1963 season. Good fishing, all!

1963 Trout Stocking Summary

LEGEND:

*—National Forest Streams
R.—River
C.—Creek
Br.—Branch
Fk.—Fork

Species Stocked:
B—Brook Trout
R—Rainbow Trout
BR—Brown Trout

	Period Stocked		
	Preseason	May	June
ALBEMARLE CO.			
Moorman R., N. & S. Fk.	R	R	R
ALLEGHANY CO.			
Jackson R., Gathright Area	B,R	R,BR	R
Jerry Run*	R	R	
Simpson C.*	R	R	
Smith C.*	R	R	R
Piney R.*	B	B	
Clifton Fge. Reservoir*	R	R	
Pounding Mill Run*	B,R	B,R	
AMHERST CO.			
S. Fk. Piney R. & Piney R. Proper	R	R,BR	R
Pedlar R., upper	R	R	R
Pedlar R., lower	R	R,BR	R
North Fk. Buffalo R.	B,R	B,R	
Brown's Mt. C.*	B	B	
Davis Mill C.*	B	B	
Enchanted C.*	B	B	
Little Irish C.*	B	B	
Pedlar R.*	R	R	BR
Rocky Row Run*	B	B	
S. Fk. Piney R.*	R	R	R
Statons C.*	B	B	B
AUGUSTA CO.			
St. Mary's R.	B,R	B,R	B,R
Calfpasture R.	B,R	B,R	
Johns Run*	B	B	
Back C.*	R	R	
Kennedy Run*	B	B	
Upper Sherando*	R	R	
Lower Sherando*	R	R	
Big Mary C.*	B	B	
N. Fk. Buffalo*	B,R	B,R	
North R.*	B,R	B	B
Trout Run*	B		
Little R.*	B		
Buffalo Br.*	B	B	
Clayton Mill Br.*	B		
E. Dry Br.*	B	B	
Jerkemtight C.*	R	R	
Ramsey Draft*	B	R	R
BATH CO.			
Jackson R., Highland Co. line downstream 1.5 mi.	B,R	B,R	B,R
Jackson R. along Rt. 623	B,R	B,R,BR	R
Jackson R. Gathright area	B,R	R, BR	B,R
Back C., Highland Co. line downstream 3 mi.	B,R	B,R	B,R
Back C. Gorge*	R	R	R,BR
Lick Run*	B	B	
L. Prong Wilson*	B	B	B
Mares Run*	B	R	B
S. Fk. Pads C.*	B	B	
Muddy Run*	B	B	B
Little Mill C.*	B		
BEDFORD CO.			
Hunting C.*	R	R	R
Reed C.*	R	R	R
Battery C.*	B		
BLAND CO.			
Clear Fk. C.	B,R	B	
Wolf C.	B,R	R,BR	R
Hunting Camp & Laurel Cks.	B,R	R	
Lick C.	B,R	R	R
No Business C. (includes Giles)	B,R	B,R	R
Lick C.*	R	R	R
Dismal C.*	R	R	R
BOTETOURT CO.			
Jennings Cr.	B,R	R,BR	R
Mill Co.	B,R	R	R
Roaring Run	B,R	B	B
North C.*	R	R	R
Middle C.*	R	R	R
McFalls C.*	R	R	R
BUCHANAN CO.			
Slate C.	B,R	R	

	Period Stocked		
	Preseason	May	June
CRAIG CO.			
Sinking C.	B,R	B,R	
Johns C.	B,R	B,R	
Potts C.	B,R	B,R,BR	R
Barbours C.*	R	R	R
N. Fk. Barbours C.*	B	B	
S. Fk. Barbours C.*	B	B	
CARROLL CO.			
Big Reed Island	B,R	R,BR	R
Little Reed Is.	B,R	R,BR	R
Crooked C.	B,R	B,R,BR	B,R
Stewart C.	B,R		
Laurel C.	B,R	R,BR	R
Burkes Fk. C.	B,R	R,BR	R
Coal C.	B,R	B	B
DICKENSON CO.			
Caney C.	B,R	B,R,BR	R
Frying Pan C.	B,R	B,R	
FLOYD CO.			
Beaver C.	B,R	B,R	R
Burks Fk. C.	B,R	B,R	R
Goose C.	B,R		
Howells C.	B,R	B,R	R
Indian C.	B,R	R	R
Meadow C.	R	R	R
Rush Fk.	R	R	R
West Fk.	B,R	B,R	R
Laurel Fk.	B,R	B,R	R
Mira Fk.	B		
FRANKLIN CO.			
Green C.	B,R	B,R	
Maggoddee C.	B,R	B,R	
Runnett Bag C.	B,R	B,R	
Blackwater R.	B,R	B,R	
FREDERICK CO.			
Back C.	B,R	B,R	
Cedar C.	B,R	R,BR	R
Paddy Run*	R	R	R
GILES CO.			
Big Stony C.	B,R	R	R
GRAYSON CO.			
Big Wilson C.	B,R	B,R,BR	B,R
Middle Fk. Helton C.	B,R	B	B
Helton C.	B,R	B	B
Big Fox C., lower 4 mi.	B,R		
Big Fox C., upper 4 mi.	B,R	B,R	R
Middle Fox C.	B,R	B,R	R
Elk C.	B,R	B,R,BR	B,R
Peach Bottom C.	B,R	B	
Chestnut C.	B,R	B	
Turkey Knob Fk. C.	B,R	B	
GREENE CO.			
Ivy Br.	B,R	B,R	
South R.	B,R	B,R	B,R
Swift Run	B,R	B,R	B,R
HENRY CO.			
Smith R.	B,R	R,BR	R
HIGHLAND CO.			
Back C.	B,R	B,R	
Bullpasture R.	B,R	B,R,BR	B,R
Crab Run	B,R	B,R	B,R
Davis Run (Stuarts Run)	B,R	B,R	
South Br. Potomac R.	B,R	B,R	
Benson Run*	B	B	
W. Dry Run*	B		
LEE CO.			
Hardys C.	B,R	B,R	
Martins C.	B,R	B,R	
N. Fk. Powell R.	B,R		
MADISON CO.			
Garth Run	B,R	B,R	
Hughes R. (includes Rapp. Co.)	B,R	B,R,BR	R
Middle R.		BR	
Robinson R.	B,R	B,R	
Rose R.	B,R	B,R	
MONTGOMERY CO.			
Brush C.	B,R	B,R	
Toms C.	B,R	B,R	
S. Fk. Roanoke R.	B,R	B,R,BR	B,R
Poverty C.*	R	R	
NELSON CO.			
Tye R.	R	R,BR	R
N. Fk. Tye R.	R	R	R
Stony C.	B,R	B,R	R
S. Fk. Rockfish R.	B,R		
PAGE CO.			
E. Fk. Hawksbill C.	B,R		
Hawksbill C.	B,R	B,R	
Cub Run*	R	R	R
Pitt Spring Run*	R	R	R
PATRICK CO.			
Dan R. (below Power House)	R	R,BR	R
Dan River (above Power House)	B,R	B,R	
Rockcastle C.	B,R	B,R	
Round Meadow C.	B,R	B,R	
N. Fk. Mayo C.	B,R	B,R	
S. Fk. Mayo C.	B,R	B,R	
Poorhouse C.	B,R		
Big Ivy Creek	B,R	B,R	
PULASKI CO.			
Big Laurel C.	B,R	R	R
W. Fk. Peak C.	R	R	
RAPPAHANNOCK CO.			
Piney Br.	B,R	B,R	
Rush R.	B,R	B,R	B,R
Thornton R., N. Fk.	B,R	B,R	
ROANOKE CO.			
Roanoke R.	B,R	B,R,BR	R
ROCKBRIDGE CO.			
Mill C.	B,R	B,R	
South R.	B,R	R,BR	B,R
Irish C.	B,R	R,BR	B,R
Elk C.*	R	R	
Hopper's C.*	R		
ROCKINGHAM CO.			
N. F. Shenandoah R.	B,R	B,R,BR	B,R
Briary Br.	B,R	B,R	
Dry R.	B,R	B,R	
German R.	B,R	B,R	
Silver Lake (Dayton)	B,R	B,R	B,R
Boones Run*	B	B	
Fridley Run*	R	R	
Carr Run*	B		
Clay Lick Run*	B		
Shoemaker R.*	R	B,R	
Long Run*	B	B	
Black Run*	B	B	
Dry Run*	B	B	
Gum Run*	B		
Hone Quarry*	B	B	
Kephart Hollow*	R	R	
Mines Run*	R	R	
Skidmore*	B	B	
Union Springs*	B	B	
RUSSELL CO.			
Big Cedar Creek	B,R	R,BR	R
SCOTT CO.			
Little Stony C.	B,R	B,R	
Stock C.	B,R	B	B
Cove C.	B,R	B,R	
Devils Fork*	B	B	
Stony C.*	R	R	R
Straight Fk.*	R	R	R
Little Stony C.*	R	R	R
SHENANDOAH CO.			
Passage C. (lower)	B,R	R,BR	B,R
Passage C. Colors Water—out of Detrick	B,R		
Big Stony C. (incl. Lower Laurel Run)	B,R	R,BR	B,R
Cedar C.	B,R	R,BR	B,R
Mill C.	B,R	B,R	
Laurel Run*	R	R	
Little Stony (above)*	B,R	R	R
Little Stony (below)*	R	R	
Mountain Run*	B	B	
Little Passage C.	B	B	
Upper Passage C.	B,R	B	
Peters Mill C.	B	B	
SMYTH CO.			
S. Fk. Holston R.	B,R	B,R	R
Lick C.	B,R	B,R	R
Big Laurel	B,R	B,R	R
Staley C.	B,R	B,R	R
Little Laurel Co.*	R	R	R

	Period Stocked		
	Preseason	May	June
Cregger C.*	R	R	
Comers C.*	R	R	R
Hurricane C.*	B	B	
Cressy C.*	B	B	
Houneshell C.*	B	B	
Dickey Br.*	B	B	
W. Fk. Nicks C.*	B		
E. Fk. Nicks C.*	B		
Rowlands C.*	B	B	
Canady C.*	B	B	
TAZEWELL CO.			
Cove C.	B,R	B,R	B,R
Laurel Co.	B,R	B,R	R
Roaring Fk. C.	B,R	B,R	B
Little Tumbling C.	B,R	B,R	B
Wolf C.	B,R	B,R	R
Punch & Judy C.*	R	R	
WARREN CO.			
Gooney Run	B,R	B,R	B,R
WASHINGTON CO.			
Whitetop Laurel C.	B,R	B,R,BR	B,R
Green Cove C.	B,R	B,R	R
Big Brumley C.	B,R	B,R	R
Big Tumbling C.	B,R	B,R	B,R
Straight Br.*	R	R	R
WISE CO.			
S. Fk. Powell R.	B,R	B,R	
N. Fk. Pound R.	B,R	B,R	
Burns C.*	B	B	
Clear C.*	R	R	R
Mountain Fk. (Big Stony)*	B	B	
WYTHE CO.			
Cripple C.	B,R	R	R
Francis Mill C.*	R	R	
E. Stoney Fk. C.*	R	R	
E. Fk. Dry Run*	R	R	
W. Fk. Dry Run*	R		
Gullion Fk. C.*	R		
W. Fk. Reed C.*	R		

Commission photo by Kesteloo

Three-quarters of a million trout await Virginia fishermen.

NATIONAL CHAMP

(Continued from page 11)

and then upgrade to make the right hand loop which paralleled the north perimeter of the plantation. Heading back south it hedgehopped ridges, ditches and rolling country; twice dipped toward the creek and turned upward until finally coming down across the "Bowling Alley" to the woods' edge, it turned north to wind up going across the open country and alfalfa fields to the vicinity of the barn. Both were tough tests of the competitors, each designed to be equal in character and feature evenly distributed game populations. The success of such planning was reflected in the general evenness in individual brace accounts.

Those who make up the sponsoring Association are men of outstanding talent and great devotion to the success of this Championship. Even as the event was concluded, they held a conclave and set in motion some ideas to further improve and add prestige to the trial. President Parke Brinkley, long a figure of widespread attachment to the field trial game, lends his talents and organizing genius as presiding head. Verle Farrow is a most conscientious and capable secretary who joined with the president in marshalling the whole running to the highest degree of perfection. Harold Crane, who doubles in brass as judge; Steve Richardson, the Richmond enthusiast; and Franklin Baugh, the barrister from Norfolk, together with the renowned "Squire" Lewis, complete the organization of this sponsoring group. Guy Lewis, Jr., affectionately known to all as the "Squire" of Hawfield, had been critically ill last summer. It was a source of joy to all present to have him make the effort to be present for a few hours on Saturday and again on Sunday to make the presentation of the trophy to the winner. The sponsoring Association obtained this year a handsome sterling silver tray, which has been suitably engraved and dedicated to the "Honoring of Guy F. Lewis, Jr.," to be known as the Hawfield Trophy. It is a perpetual trophy with a replica awarded each year to the owner of the champion.

In the accoutrements which go to make for success in every important trial, this stake is superb. Headquarters have been maintained for many years at the President Madison Inn at Orange. Owner-manager Welford Sherman and his courteous, efficient staff have long coped with bird dog field trialers and now take them in their stride, in catering to perfection to their needs and desires. The cozy, informal atmosphere at headquarters is a most attractive feature.

On Sunday evening preceding the drawing, the Chamber of Commerce of Orange were hosts to the field trial contingent of more than 70 people, with a score of the Chamber officials and their charming wives on hand to extend a cordial and hearty welcome. It was at this affair that the Hawfield Trophy was first unveiled.

The entire stable of fine walking and gaited horses, which are a part of the Hawfield installation, were made available, through the generosity of the owner, and provided mounts for judges, your reporter, marshals and other guests. Additional horses were available from the stables of Dale Bartley of Staunton, and most appreciated were the services of Dick McAfee, who worked hard and long caring for, saddling and supervising the management of this end of the trial. Deserving also of accolades were Dick Cross, Game Division Chief, Commission of Game and Inland Fisheries, and others of this staff who assisted from time to time. Kennel facilities and stables for horses were provided gratis, courtesy of Hawfield.

Evidence of the growing interest in this trial is manifest by the attendance of persons who made long journeys to be present for part or all of the running: Roy Manning, Smyrna, Georgia; L. F. Bissell, Rockville, Connecticut; Dr. A. C. Glover and his wife, Jane, Elmira, New York; Bob Wehle, Rochester, New York; Chet Ketner and Frank Cassidy, Pennsylvania; Jay Waggoner and James Burgess, North Carolina; Hugh Larmore, Salisbury, Maryland; Doc and Tillie Nitchman, Cranbury, New Jersey; Harrison Biggi, Lexington, Massachusetts; S. L. Froehlich, West End, New Jersey; numerous field trial personalities from Virginia and Washington, D. C. area, and probably many more that our porous memory has neglected.

Judging for this fine stake was in the capable hands of a pair of well established men—Harold A. Crane of Port Republic (Resthaven) Maryland, and Les Tichenor, Jr., of Far Hills, New Jersey. Their performance and diligent attention to the task won admiration and respect from all

Wildlife Conservation Unit 2. Birds and Game Bird Management Study 3B - -

Habitat Management

By DOROTHY E. ALLEN
Education Officer

OUR *objectives* are:

1. To impress upon students how man's interference with nature can affect natural resources.
2. To help students understand how we can use wisely our natural wildlife resources.
3. To show how game management is related to other forms of land use.

Wildlife is a crop of the land. It is a natural, renewable resource which may be produced and annually harvested just as any crop. If we can maintain sufficient brood stock, provide suitable habitat, and harvest the annual surplus, the resource will flourish. Ignore these basic principles and wildlife will suffer. Wildlife management is one phase of land management.

The *production* of wildlife is governed by natural laws—the basic facts of birth, death and the need of living things for food, water and shelter. We cannot remake natural laws to suit ourselves; all we can do is to understand them and work with them. These natural laws are the basis for one of the important principles of wildlife management—the principle of the *carrying capacity of the land*.

Carrying capacity is the quantity of any species of wildlife which any piece of land can support or "carry" at one time. The amount and quality of the food, cover, and water which determine carrying capacity are, in turn, determined by (1) the kind of soil and its fertility, and (2) the way the land is used.

Fertility is the richness of the soil—the kinds and amounts of food elements, like iron and calcium and nitrogen, contained in the soil in forms that can be used, first by plants and, in turn, by animals. If there isn't enough lime or phosphorous in the soil to grow bones and teeth and to make good blood, the wild animals that live there will be few and unhealthy. If there aren't enough vitamins forthcoming from the soil, the animals will be diseased and will fail to bear enough healthy young.

Attention: Teacher

The impact of man's activities on wildlife habitat or environment produces man's greatest effect upon wildlife itself. Man's influence on wildlife habitat often determines not only numbers of plants and animals but also the conditions under which they live. If land is managed for farm crops, wildlife is in most cases a secondary product of the land. In Virginia there are many other areas such as forests, mountains, and swamps which are not managed for crop production. These areas also provide habitat for many interesting and valuable forms of wildlife and, just as with farm land, this wildlife habitat is responsive to man's activities in managing vegetation, soil and water.

Conservation laws are aimed at achieving orderly, equitable harvest of game species. Laws have limitations. The real key to wildlife abundance is habitat improvement. Lands can be managed to provide a better distribution and greater abundance of food and cover for both game and nongame species.

The best *land use* is that which produces the greatest benefit for the people while conserving the soil. Some land may be used chiefly for grain while other land, which cannot be cultivated without erosion, must be kept in pasture or meadow. Still other land, unsuited either for cultivation or grazing, will grow valuable timber. In many parts of Virginia the pattern of land use must be greatly varied—a tract here in cultivation, a strip there in grass, a hillside or waterway in trees.

Soil fertility can be built up or conserved, and land use can be changed for a better balance with nature. Doing this is profitable to the farmer and it helps wildlife by increasing carrying capacity of the land. Therefore, carrying capacity for wildlife can be increased by the same methods which help the farmer improve his land and crops.

Habitat improvement, as a part of an over-all wildlife management plan, is the key to abundance.

Managing Land To Meet Wildlife Requirements

(From *Making Land Produce Useful Wildlife*, Farmers Bulletin No. 2035, Soil Conservation Service, U. S. Department of Agriculture)

Cropland management practices helpful to useful wildlife include:

1. Crop rotations that included grass-legume meadow.
2. Liming and fertilizing.
3. Strip cropping.
4. Use of cover crops.
5. Stubble-mulch tillage.
6. Delaying mowing of watercourses and headlands until after grain harvest.
7. Spring plowing.
8. Leaving ⅛ to ¼ acre of grain standing next to good cover.
9. Spreading manure near cover in winter.

Practices harmful to wildlife include burning, clean fall plowing, early mowing of watercourses and headlands, and indiscriminate use of insecticides and weed killers.

Pasture land management practices helpful to useful wildlife:

1. Grazing within the carrying capacity of the pasture.
2. Liming and fertilizing.
3. Reseeding or renovating.

Practices harmful to wildlife include burning, grazing too heavily, and complete clean mowing early in the season.

Woodland management practices useful to wildlife include:

1. Protection from fire and grazing.
2. Selective cutting in small woodlands.
3. Leaving two den trees per acre when cutting timber.
4. Piling brush near the edge of the woods.
5. Leaving fallen hollow logs.
6. Clear-cutting of small areas in large woodlands.

Harmful practices are burning, grazing, clear-cutting of large areas, and cutting out all den trees.

Suggested Activities

1. Map your community, showing types of ground cover, streams, ravines, and hillsides. Show where trees might be planted and food sources located for wildlife.
2. Make a study of a swamp, a forest, and a field, relative to bird, animal, and plant life, and see how each is dependent upon the other.
3. Make an inventory of the wildlife in your community. On your record show the place found, abundance, and need for protection.
4. Plant a wildlife food patch.
5. Erect a bird house or bird feeder.

Some Reference Materials

Cross, Richard H. "Sound Management Is The Answer," VIRGINIA WILDLIFE, XXI (August, 1960). Reprint A-3.

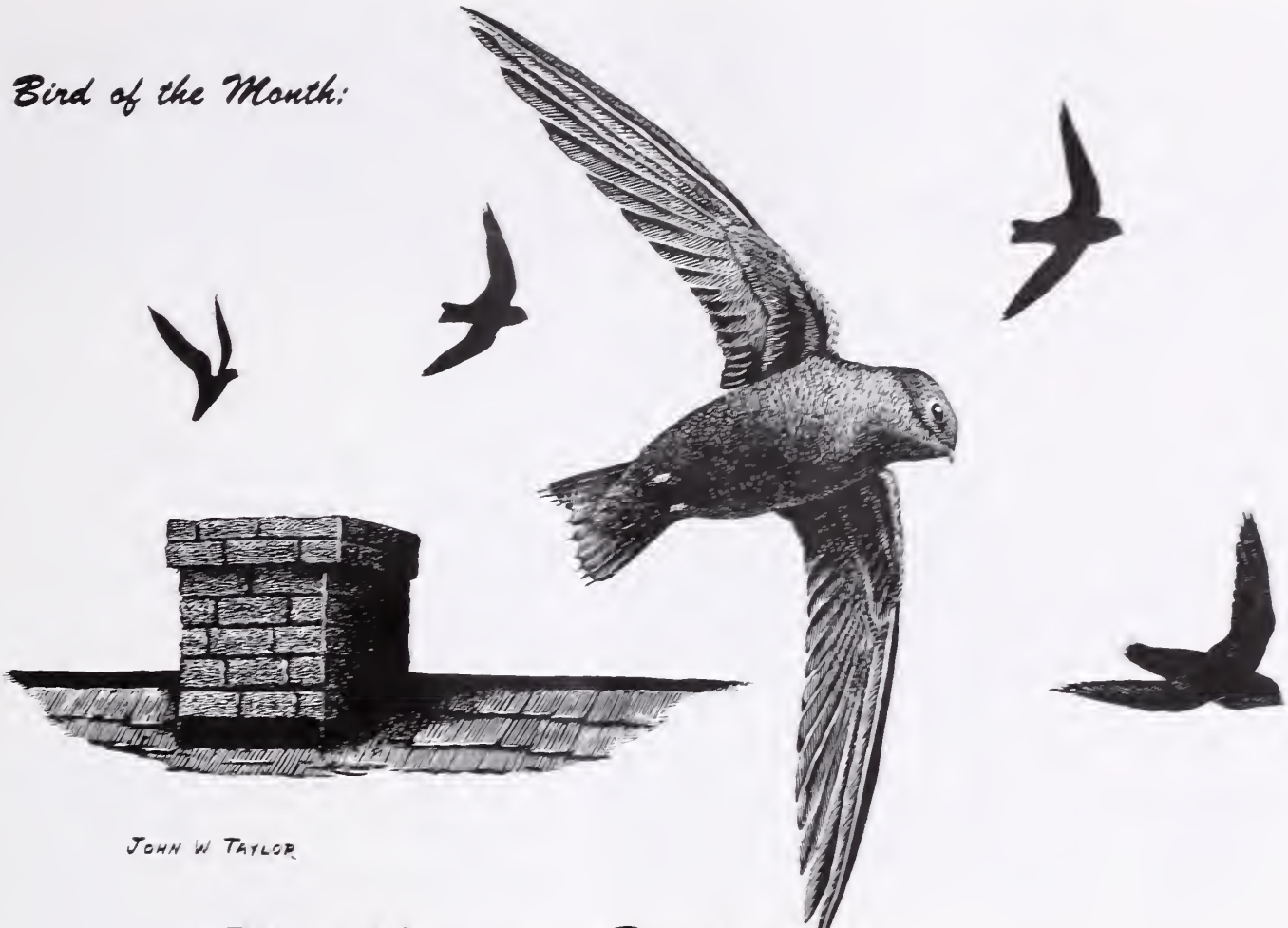
"Provide Cover for Wildlife." VIRGINIA WILDLIFE, XXI (April, 1960). Reprint D-4.

"Provide Food for Wildlife." VIRGINIA WILDLIFE, XXI (March, 1960). Reprint D-3.

"Twenty-Five Ways To Aid Wildlife." Richmond: Commission of Game and Inland Fisheries. Reprint G-6.

These 16 mm motion pictures in color are available from the game commission: Chain of Life (11 min.), Our Magic Land (16 min.), Prescription For Wildlife (33 min.), A Way of Life (25 min.), Yours Is The Land (22 min.).

Bird of the Month:



The Chimney Swift

By J. J. MURRAY
Lexington, Virginia

A FEW days ago, in a sky that except for an occasional wandering crow or a fast-flying flock of starlings has been silent all winter, I heard a series of eager chittering notes. The chimney swifts had returned from their winter quarters in the distant Amazon forests to spend the summer in what we, and evidently they too, think is nicer country along the James River.

The air was full of them, freer in the sky than any man-made machine, busy about their trade of insect catching and at the same time full of the zest of living, wheeling and darting like little arrows shot from an invisible bow.

No bird is so much at home in the air. All its daylight hours are spent on the wing. Except when it is nest-building or feeding young, it does not come to rest from dawn to dusk. It takes all its food in the air; it even drinks on the wing, scooping up a bill-full of water from the surface of a stream as it flies.

How can this bird stay in flight without rest for 16 hours, putting out all the while such a tremendous amount of energy? The ability to do this depends upon its rapid metabolism. Digestion is so rapid that the food it catches on the wing is transformed into energy almost at once. Every beat of the wings uses up energy; but every pull of the powerful breast muscles expands the lungs so as to draw in more oxygen with which to burn up the food and turn it into more energy. If there were continuous daylight and plenty of food in the air, it seems not impossible that the swift could spend its whole life in such continuous motion.

There are still a few chimney swifts that scorn man-made chimneys and that preserve the ancestral habit of nesting in hollow trees. I have seen this at Virginia's geographical extremes: in the ancient hollow cypresses of the waters of Lake Drummond and in cavities in the oaks at the top of Mount Rogers.

No matter how free in the air, swifts must come to earth to rear their young. The nest is an interesting half cup, fashioned of tiny dead twigs glued together by the bird's gummy saliva and fastened to the side of the chimney. In the Orient the clear glue from the nest of one species of swift is highly prized for making the delicacy of bird's nest soup. At night the swift sleeps in the chimney, hanging by its tiny claws and bracing with its stiff central tail feathers.

In this little cup four or five small white eggs are laid. The eggs are incubated for about three weeks. After a month in the nest and in the chimney the young are able to fly. Occasionally rain will soften the glue, so that the nest breaks loose and carries the eggs or the tiny young into the fireplace below, where the eggs break or the young perish. Sometimes an adult bird will drop too far and come out into the room below, flying desperately about, to the dismay of the housekeeper and the detriment of her white curtains.

Edited by DOROTHY ALLEN

Staunton Virginian Photo

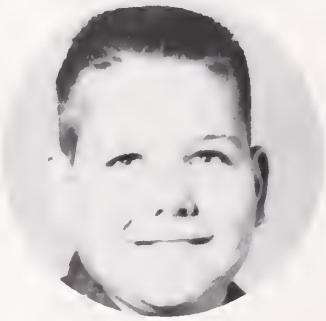
Winners of the Izaak Walton League-sponsored food patch contest were honored with a dinner and presented with a shotgun or rifle, and a turkey caller. Kneeling, from left to right are the 4-H winners: Millard Driver, Milton Driver and Norwood McClung. Standing, from left to right are the F.F.A. winners: Jerry Sheffer, Wesley Grove, and Charles Dennison.

Wildlife Awards

A food patch contest sponsored by the Staunton-Augusta Chapter of the Izaak Walton League encourages young boys to take an active interest in the preservation of wildlife and natural resources.

H. I. Todd, Game Warden, presented the awards to the winners (see above) and pointed out that it is necessary for the hunter to understand and appreciate the feelings of the landowner.

Charles City County Winner



John A. Hughes, III, age 12, was the first place winner of $10.00 in the food patch contest sponsored by the Charles City Ruritan Club. Willie Minter was second place winner of $5.00, and Tom Berry placed third and received $3.50. All three boys are 4-H Club members. B. L. Adams, Game Warden. Charles City County, helped with the contest.

Thankful

I love the sunshine, the mountain breeze,
The smooth clear waters, and the birds so free.
Sometimes I wonder, just how can it be,
Nature made so much, and gave it to me.
The star-sprinkled heavens, each precious stone,
There's a beautiful rainbow after strong winds have blown.
Sometimes I wonder, when I'm alone,
How such things of beauty can be all my own.
All of the flowers, and pine trees so tall,
Praise each little creature and the colors of Fall.
Though I may wonder in God's wooded halls,
I feel a strong hand about me, and I'm thankful for all.

—Maxwell T. Mandel
Age, 16
Alexandria, Virginia

Nature Camp, 1963

Conservation education is the aim of the camp. Classes are given in entomology, forestry, botany, wildlife, soils, geology, bird study, astronomy, and ecology. Schedule:

June 16—June 29: Grades 9-10-11-12
June 30—July 13: Grades 7-8
July 14—July 27: Grades 6-7
July 28—August 10: Grades 5-6

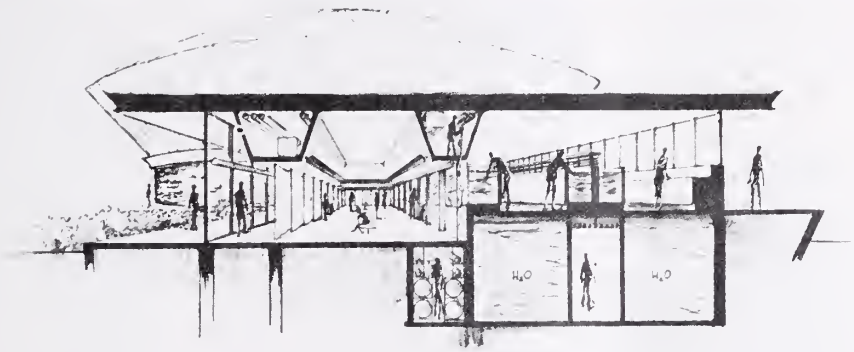
Parents interested in sending campers should write to Mrs. Fred Schilling, Rt. 2, Box 148, Afton, for applications and brochures.

Roy Lee Reynolds of Covington with his prize catch of the year. He caught the 3-pound, 19-inch smallmouth bass in Jackson River.

Wildlife In America's History

Did you know that there are more white-tailed deer in the United States now than when the first settlers arrived? That most of our antlered elk were hunted down so that two teeth could be used for charms? That there is a monument to the bollweevil in Alabama; another to the gull in Salt Lake City?

These and many other facts and legends about American wildlife—buffalo, bear, beaver, swan, salmon and many others—fill the pages of the latest book by Will Barker, published by Robert B. Luce, Inc., Washington, D. C. Price $3.50.



National Fisheries Center Approved

A National Fisheries Center to be constructed in the District of Columbia at a cost of nearly $10 million has been given final approval. Tentative plans include salt-water and fresh-water community circular pools, each 80 feet in diameter by 14 feet deep, to be viewed from three levels. Six additional community pools, both salt and fresh water, are planned, each to be 56 feet across by 10 feet deep, to be viewed from two levels. About 160 individual tanks are contemplated for salt and fresh water specimens in their natural surroundings.

A 400 foot trout stream will discharge into an 80 foot bass bayou and rain forest setting. A tropical community pool 32 feet across and 8 feet deep will be designed for two level viewing. The entire complex is expected to accommodate some 1300 species of fish and associated aquatic life.

The National Fisheries Center and Aquarium is expected to attract about eight million annual visitors. In addition to its educational aspects, the unit is to be a functioning research center for fisheries investigations. An admission charge of about 60 cents for adults and 30 cents for children is expected to defray construction costs and provide an annual operating budget of $800,000 per year. When preliminary surveys are completed, construction is expected to take about 2½ years.

Fish Book Gives Lowdown on Virginia's Finny Set

Do you want the lowdown on your piscatorial playmates so you can give that slightly used fishing rod more exercise during the coming fishing season? If so, you need a copy of *Freshwater Fishing and Fishlife in Virginia*, a 104-page book available from the Virginia Game Commission for 25 cents, which covers Virginia freshwater fish and fishing from A to Z. Beginning with a species by species account of their life habits, it includes basic secrets such as what they like to eat when you think they aren't eating at all, along with the best fishing techniques for each species.

Additional chapters deal with hatcheries, fish management and research, pond construction, and even how to prepare, cook, and serve your catch in taste-tempting ways. One chapter tips the angler off to the hot spots in the state for each type of angling. Fifty of the most common questions about fish, fishing, and fishing laws are answered for the reader.

Appendices include a list of reference books, pamphlets, and free materials available on fish and fishing, along with a complete listing of Virginia's public fishing waters and what they have to offer. The fish book can be obtained by sending 25 cents to the Virginia Game Commission, Box 1642, Richmond, Virginia.

Wetland Acquisition Halved

Only $12 million of the $105 million loan approved by Congress for waterfowl wetland acquisition has been allocated for use in President Kennedy's 1964 fiscal year budget. With the addition of about $4 million in duck stamp receipts, it will mean that $16 million will be available for the acquisition of critically needed wetlands during the coming fiscal year.

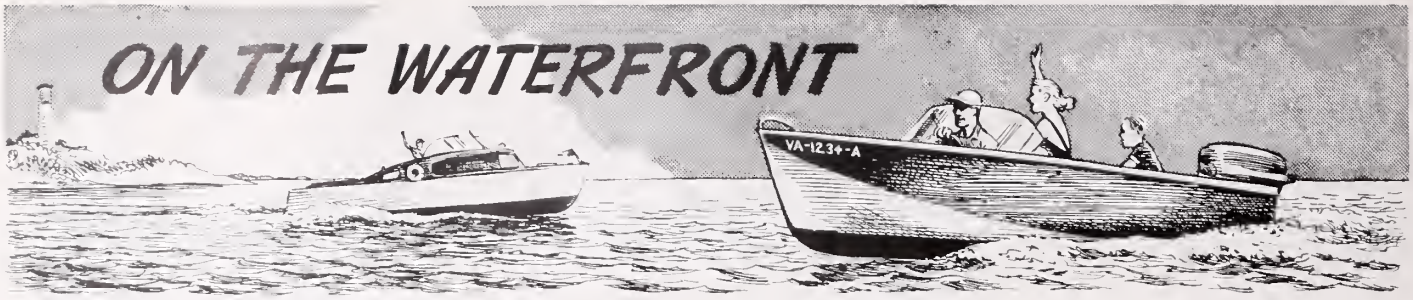
According to the National Wildlife Federation, conservationists had hoped for a $21 million allotment to speed up the seven-year program, now in its second year. Subtracting the $12 million allocation plus the $7 million alloted last year, there will remain $86 million to be distributed over the remaining four years.

Virginia Biologist to Head Foreign Game Bird Committee

H. J. Tuttle, district game biologist for the Virginia Commission of Game and Inland Fisheries and head of that agency's Foreign Game Bird Introduction program, has been appointed chairman of the Foreign Game Committee of the Southeastern Section of The Wildlife Society. Mr. Tuttle has been asked to submit a unified report of activities in foreign game introduction in the 12 states at the annual meeting of the southeastern group in Hot Springs, Arkansas, next October.

Surry County Bucks

Posing with their fine trophies taken during the past season in Surry County are L. H. Ambrose, Jr., left, and R. H. Grissom. They are members of the Southwark Hunt Club. The deer kill in Surry County during the past season was more than twice that of the previous year.



Edited by JIM KERRICK

New USCGA Text on Seamanship And Safe Boat Handling

A new book based on the U. S. Coast Guard Auxiliary instruction courses has been written by Captain Blair Walliser, U.S.C.G.R. The book was prepared by Rutledge Books and published by Doubleday & Co. in 1962 ($4.95, 256 pages, profusely illustrated in colors; Library of Congress Catalog Card No. 62-19528).

This book is especially clear, detailed, and understandable; and features "safety tips" throughout. It covers the subjects taught in the basic seamanship and safe boat handling courses of the U.S. Coast Guard Auxiliary, and is designed for reference use in conjunction with these courses, as well as those of the U.S. Power Squadrons, the American Red Cross, Boy Scouts, and Outboard Boating Club of America.

It is a practical handbook the boat owner can keep on board for ready reference, and includes: check lists for getting under way and for securing ship, reproductions in color of code flags and their meanings, sections on buoyage and charts, lists of storm warnings, whistle signals, marine and navigation lights, tables of Coast Guard districts, chart and weather information centers, and an excellent index.

Each of the major sections is concluded with a page or more of specific and helpful "safety tips". Here, for example, are the "Safety Tips" for the chapter on "The Outboard Motor and Boat":

* There are three sure signs of the beginner in outboarding: running through harbors at excessive speeds; buzzing docks and swimmers; discomfiting other boats with boat's wake. Avoid these errors. Teach youngsters to avoid them.
* Always watch your wake when passing near other boats or in a crowded harbor. Remember that you are legally responsible for any damage done by your wake.
* Always keep your craft shipshape. Repair any hull leaks; keep engine clean and all equipment in good working shape.
* When testing your outboard engine in a barrel, be sure you have adequate ventilation. Gas fumes in an enclosed garage or basement can be silent assassins.
* Extra gasoline aboard should be carried only in an approved container and stowed in a safe location.
* Motor should be turned off when fuel is being added.
* Tanks should be removed from the boat for filling. Tank should be resting on a level surface, preferably a dock, away from any flame or spark in the event of spillage.
* Batteries should be protected by a plastic top or cage to prevent accidental shorting.

Asking for Trouble

Commission photo by Harrison

Never smoke when refueling your boat. Be sure your nozzle is grounded. Gasoline fumes mixed with air are highly inflammable and explosive in confined spaces, such as the upper portion of a partially empty tank.

Commission photo by Kesteloo

This is not the proper way to change positions in a small craft. Only one person should move at a time and he should remain low, keeping at least one hand on the gunnel for balance.

Commission photo by Harrison

This boat is not only in danger of being swamped by the slightest wave action, such as that germinated by a passing power boat, but it also could be capsized by the slightest movement on the part of the occupants. If there are non-swimmers in this family, they should be wearing life jackets.

Safety Seminar

The Virginia Safety Association and the Governor's Highway Safety Committee, in cooperation with the Hampton Safety Council, will hold a one day safety seminar on April 17, 1963, at the Holiday Inn, Hampton, Virginia. The conference will stress water safety, school and traffic safety. The public is invited, and all individuals and agencies concerned with safety promotion in the Hampton area are urged to attend or be represented. Contact Maxwell Farabee, President, Hampton Safety Council, 3005 West Avenue, Newport News, Virginia, or call Newport News, CHurch 7-5897, for further details.

Boating Explosion

There is no slow-down in sight in the explosive growth of the sport of boating, or in the giant boating industry that supports it. This year's boat show at New York pulled in a record attendance, and beat last year's $34,000,000 sale of boats ranging from $39 models to a $61,670 cruiser. New models and new materials are continuing to show their popularity. Fiberglass and plastic have jumped from 35% of new hull construction to 52% in four years.

Boat owners with rising incomes and increasing opportunities to get out on the water are trading up, creating a general trend toward larger and costlier models.

REMEMBER THE *BIG ONES* FOREVER . . .

with a Virginia Wildlife

TROPHY FISH CITATION!

MINIMUM CITATION SIZES:

Largemouth Bass	7 lbs.	Crappie	3 lbs.	Other Trout	5 lbs.
Smallmouth Bass	4 lbs.	Striped Bass	10 lbs.	Channel Cat	10 lbs.
Kentucky Bass	3 lbs.	Pickerel	4 lbs.	Flathead Cat	20 lbs.
Sunfish	1 lb.	Walleye	8 lbs.	Carp	20 lbs.
Rock Bass	1 lb.	Brook Trout	3 lbs.	Gar	10 lbs.
White Bass	2 lbs.			Grindel	10 lbs.

APPLICATION FOR VIRGINIA FRESHWATER FISH CITATION

Angler's Name _____

Address _____

City _____ Zone _____ State _____

Kind of fish _____ Weight _____ lbs. _____ oz; Length _____ inches

Where caught _____ Date caught _____

Weighed at _____ (store or other public scales)

Weighing witnessed by _____, _____
Signature Address

How caught—Fly Rod ☐ Spinning Rod ☐ Casting Rod ☐ Trot Line ☐ Other_____

RULES:

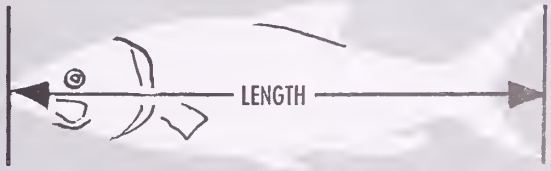
Fish must be caught in Virginia Waters by legal methods during seasons open for the taking of the species involved.

Fish must be weighed at a public scales that is periodically inspected by the Commonwealth of Virginia.

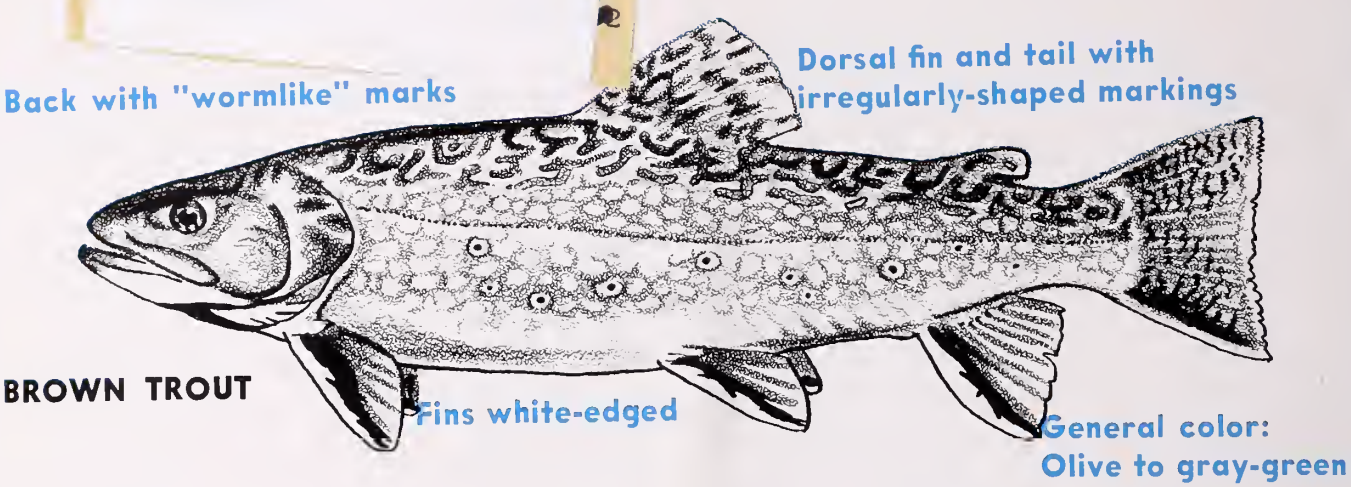
Photographs are desirable as further proof of authenticity but are not required.

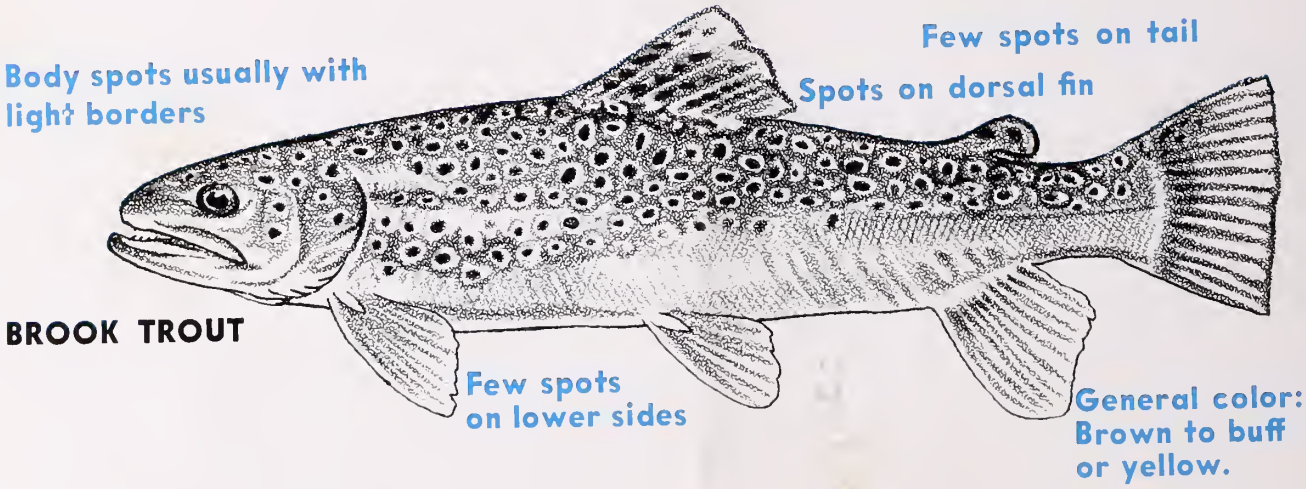
Non-residents as well as residents are eligible for citations if fish are caught under the above conditions.

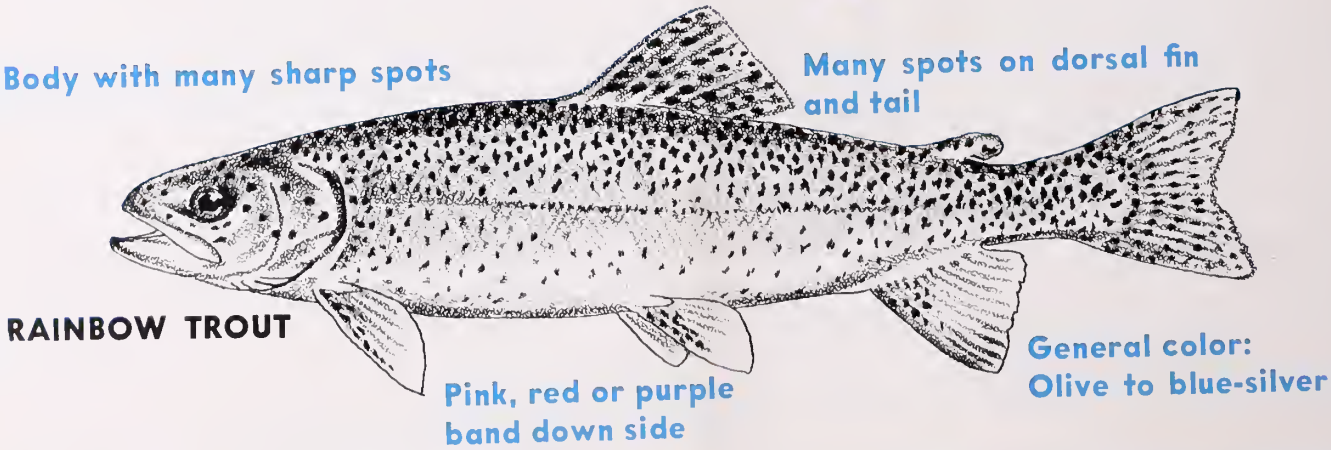
HOW TO MEASURE:



CLOSE-UP on TROUT







D. RAVER